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THE EXHIBITS

OF THE

SMITHSONIAN INSTITUTION

AND

UNITED STATES NATIONAL MUSEUM

AT THE

ALASKA-YUKON-PACIFIC EXPOSITION

SEATTLE, WASHINGTON

1909

WASHINGTON
1909

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GENERAL VIEW OF THE SMITHSONIAN INSTITUTION AND NATIONAL MUSEUM EXHIBITS

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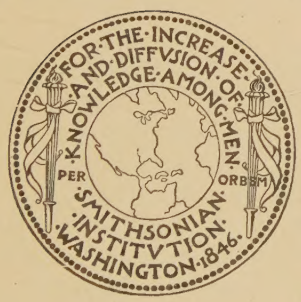

WASHINGTON
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NATURAL HISTORY MUSEUM OF LOS ANGELES COUNTY
library

WASHINGTON, D. C.
PRESS OF JUDD & DETWEILER, INC.
1909.

Exhibits of the Smithsonian Institution and United States National Museum at the Alaska-Yukon-Pacific Exposition, Seattle, Washington, 1909.

INTRODUCTION.

Smithsonian Institution and U. S. National Museum.

The Institution was established by statute in 1846, under the terms of the will of James Smithson, who bequeathed his fortune in 1826 to the United States for the "increase and diffusion of knowledge among men." From the income of the fund a building, known as the Smithsonian building, was erected on land given by the United States. The Institution is legally an establishment having as its members the President of the United States, the Vice-President, the Chief Justice, and the President's Cabinet. It is governed by a Board of Regents consisting of the Vice-President, the Chief Justice, three members of the United States Senate, three members of the House of Representatives, and six citizens of the United States appointed by joint resolution of Congress. It is under the immediate direction of the Secretary of the Smithsonian Institution, who is the executive officer of the board and the director of the Institution's activities.

For the increase of knowledge, the Institution aids investigators by making grants for research and exploration, supplying books, apparatus, laboratory accommodations, etc. It occasionally provides for lectures, which are published. It has initiated numerous scientific projects of national importance, some of which have been turned over to the Government and resulted in the creation of independent Government bureaus. It advises the Government in many matters of scientific importance, especially in those that have an international aspect. It coöperates with scientific bodies of national importance, like the National Academy of Sciences, the American Association for the Advancement of Science, the American Historical Association, etc. It issues three regular series of publications: *Annual Reports,* containing papers of general interest intended to keep the ordinary reader abreast of the progress of science; *Contributions to Knowledge,* the distinct feature of which is that each memoir constitutes an original contribution to knowledge; *Miscella-*

neous Collections, which contain bibliographies, reports of expeditions, standard tables, and a scientific quarterly. All these publications are distributed gratuitously to important libraries throughout the world.

The Hodgkins Fund, the income of $100,000 of which is for the increase and diffusion of knowledge in regard to the nature and properties of atmospheric air in connection with the welfare of man, has made grants, issued publications, and awarded medals and prizes.

The Institution maintains a library in coöperation with the Library of Congress, which numbers 250,000 volumes, and consists mainly of the transactions of learned societies and scientific periodicals. While the body of the library is deposited in the Library of Congress and accessible to all its readers, a working library is maintained at the Institution. Lists, bibliographies, rules for cataloguing, and library work have been published. It supports a table at the Biological Station at Naples. All these and numerous other activities may be carried on solely from the income of the Smithsonian fund. The Regents are empowered to accept gifts without action of Congress, in furtherance of the purposes of the Institution, and to administer trusts in accordance therewith.

The United States National Museum is the depository of the national collections. It is especially rich in the natural history, geology, paleontology, archeology, and ethnology of America, and has unique collections of American history, as well as many series relating to fine arts and the industrial arts. It is both an educational and research museum, and issues numerous technical and popular scientific publications.

Alaska-Yukon-Pacific Exposition.

The act of Congress, approved May 27, 1908, authorizing an exhibit by the departments and bureaus of the Government at the Alaska-Yukon-Pacific Exposition, appropriated the sum of $200,000, to be expended under the direction of the United States Board of Managers composed of three persons in the employ of the Government, one to be designated by the President as Chairman, and one as Secretary and Disbursing Officer, who were charged with the selection, purchase, preparation, transportation, arrangement, safekeeping, exhibition, and return of such articles and materials as the heads of the several departments and Secretary of the Smithsonian Institution respectively decide shall be embodied in the Government exhibit herein authorized. There was also appropriated $125,000, to be expended under the direction of the Secretary of the Interior, to aid the people of the district of Alaska and the Territory of

Hawaii in providing and maintaining appropriate and creditable exhibits of the products and resources of Alaska and Hawaii, and $25,000, to be expended under the Secretary of War, to aid the people of the Philippine Islands in providing and maintaining an appropriate and creditable exhibit of the products and resources of the Philippine Islands. In addition to this, the Secretary of the Treasury was directed to erect suitable buildings for the said Government exhibit, including an irrigation and biograph building; also a fisheries building, and buildings for the exhibits of the district of Alaska, the Territory of Hawaii, and the Philippine Islands, for which an appropriation of $250,000 was made. Mr. Jesse E. Wilson, Mr. W. de C. Ravenel, and Mr. W. M. Geddes were appointed members of the Government Board of Managers; Mr. Wilson chairman and Mr. Geddes secretary and disbursing officer.

The act also provided that the Smithsonian Institution and National Museum should exhibit such articles and material of an historical nature as would impart a knowledge of our national history, especially that of Alaska, Hawaii and the Philippine Islands, and that part of the United States west of the Rocky Mountains. The Secretary of the Smithsonian Institution designated Mr. Ravenel, Administrative Assistant, U. S. National Museum, as representative of the Smithsonian Institution and National Museum to the Government Board, which was created by Congress and charged with the preparation of the exhibit. Of the total appropriation, $24,000 was allotted to the Smithsonian Institution and National Museum, and about 10,000 square feet of space in the main Government building.

Plan of Exhibit.

The plan of the exhibit as approved by the Secretary outlines the progress and achievements of the nation, and especially deals with the men and facts determining the development, not only of the United States as a whole, but especially of the western portion—Alaska, Hawaii, and the Philippine Islands.

The exhibit consists of

1. Portraits of eminent persons associated with the discovery and history of America.
2. Portraits of eminent persons connected with the history of the Pacific Coast and Alaska.
3. Portraits of eminent persons connected with the history of the Hawaiian Islands.

4. Portraits of eminent persons connected with the history of the Philippine Islands.
5. Historic scenes and landmarks.
6. History of the capitol.
7. Historic vessels.
8. Early American steamboats.
9. History of land transportation.
10. History of the contributions of Henry and Morse to electricity and the telegraph.
11. Medallic history of the United States.
12. History of American cartography.
13. History of the territorial expansion of the United States.
14. History of the Pacific Coast and Alaska:
    - History of California Missions.
    - The Russian Orthodox Church in Alaska.
    - Church of Jesus Christ of Latter Day Saints.
    - Aborigines of the Southwestern United States.
    - Ancient Pueblos of Arizona and New Mexico.
    - The aborigines of California.
    - History of British Columbia.
    - The aborigines of the North Pacific Coast and Southeastern Alaska.
    - Western Eskimo.
    - Historical Paintings of Alaska.
15. Peoples of the Philippine Islands:
    - Civilized and uncivilized peoples.
    - Series of photographs.
16. Peoples of the Hawaiian Islands:
    - Model of village.
    - Series of photographs.
    - Emerson ethnographic collection.
    - Church Mission work in Hawaii.
17. Peoples of the Samoan Islands:
    - The natives.
    - Paintings and photographs.
18. The Natives of Guam:
    - Series of photographs.

19. History of photography.

20. History of medicine in America.

The preparation of the exhibits in Washington was carried on under the direction of Prof. W. H. Holmes, Dr. Walter Hough, Mr. T. T. Belote, Dr. I. M. Casanowicz, Dr. J. Walter Fewkes, Mr. T. W. Smillie, Dr. J. M. Flint, U. S. N., and Mr. George C. Maynard. The groups were modeled by Mr. U. S. J. Dunbar; the models of Casa Grande and Santa Barbara Mission were prepared by Mr. H. W. Hendley; and the model of the Hawaiian village by Mr. I. B. Millner. The ethnographic exhibits were set up by Mr. T. W. Sweeny.

The exhibits from the California Missions were secured by George Wharton James; from the Russian Orthodox Church of Alaska by Rev. A. P. Kashevaroff; from the committee of the Church of Latter Day Saints by Mr. O. F. Whitney, chairman; from Hawaii by Mr. N. B. Emerson and the Board of Hawaiian Evangelical Association. Photographs and paintings were secured through the kindness of Mr. H. W. Henshaw, Lieut. George T. Emmons, U. S .N., Mr. T. J. Richardson, Dr. C. H. Townsend, and Mr. W. E. Safford.

Special mention is made of the assistance cordially given by the U. S. Department of State, the U. S. Department of War, the Signal Corps, the Bureau of Fisheries, and the Bureau of American Ethnology and American Museum of Natural History.

On June 1, when the Exposition was opened by the President, the exhibits as described in the appended catalogue, prepared by Dr. Walter Hough and Mr. T. T. Belote, were installed, labeled, and ready for inspection by the public.

ALASKA-YUKON-PACIFIC EXPOSITION.

PORTRAITS OF EMINENT PERSONS ASSOCIATED WITH THE DISCOVERY AND HISTORY OF AMERICA.

Christopher Columbus, Discoverer, 1435–1506.
John Cabot, Discoverer, Died 1498.
Americus Vespucius, Discoverer, 1451–1512.
Ponce De Leon, Explorer, 1460–1521.
Fernando De Soto, Discoverer, 1496–1542.
Henry Hudson, Discoverer.
Sir Walter Raleigh, Explorer, 1552–1618.
Samuel De Champlain, Explorer, 1567–1635.
Captain John Smith, Pioneer, 1580–1635.
Lord Baltimore, Governor, 1580–1632.
John Winthrop, Statesman, 1588–1649.
Roger Williams, Founder of Rhode Island, 1599–1683.
William Penn, Founder of Pennsylvania, 1644–1718.
Elihu Yale, Philanthropist, 1649–1721.
Benjamin Franklin, Statesman, 1710–1785.
Jonathan Trumbull, Statesman, 1710–1785.
Israel Putnam, Soldier, 1718–1790.
Roger Sherman, Statesman, 1721–1793.
George Washington, President, 1789–1797.
John Adams, President, 1797–1801.
John Jay, Chief Justice, 1789–1795.
Samuel Adams, Statesman, 1722–1803.
Christopher Gadsden, Soldier and Patriot, 1724–1805.
James Otis, Statesman, 1725–1783.
George Mason, Statesman, 1725–1792.
Francis Marion, Soldier, 1732–1795.
David Rittenhouse, Astronomer, 1732–1796.
Joseph Priestley, Chemist, 1733–1804.
Robert Morris, Statesman, 1734–1806.
Daniel Boone, Pioneer, 1735–1820.
Patrick Henry, Statesman, 1736–1799.
John Hancock, Statesman, 1737–1783.
Charles Carroll, Statesman, 1737–1832.
Oliver Ellsworth, Chief Justice, 1796–1800.
Benjamin West, Painter, 1738–1820.
Anthony Wayne, Soldier, 1745–1796.
Charles C. Pinckney, Statesman, 1746–1825.
James Madison, President, 1809–1817.
James Monroe, President, 1817–1825.
John Paul Jones, Commander, U. S. N., 1747–1792.
Stephen Girard, Philanthropist, 1750–1831,
Stephen Decatur, Naval Officer, 1751–1808.

George Rogers Clark, Soldier, 1752–1818.
Edmund Randolph, Statesman, 1753–1813.
Benjamin Thompson (Count Rumford), Physicist, 1753–1814.
Joel Barlow, Poet and Patriot, 1754–1812.
Gilbert C. Stuart, Artist, 1755–1828.
Alexander Hamilton, Statesman, 1757–1804.
James Wilson, Statesman and Jurist, 1742–1798.
Elbridge Gerry, Vice-President, 1813–1814.
John Marshall, Chief Justice, 1801–1835.
Andrew Jackson, President, 1829–1837.
Marquis de Lafayette, Soldier, 1757–1834.
W. H. Thornton, Architect, 1761–1828.
B. H. Latrobe, Architect, 1764–1820.
Eli Whitney, Inventor, 1765–1825.
James Smithson, Founder Smithsonian Institution, 1765–1829.
Henry Clay, Statesman, 1777–1852.
John J. Audubon, Ornithologist, 1780–1851.
Daniel Webster, Statesman, 1782–1852.
Washington Irving, Author, 1783–1859.
Oliver H. Perry, Commodore, U. S. N., 1785–1819.
John Quincy Adams, President, 1825–1829.
John C. Calhoun, Vice-President, 1829–1833.
Martin Van Buren, President, 1837–1841.
William Henry Harrison, President, 1841–1841.
Winfield Scott, General, U. S. A., 1786–1866.
John Tyler, President, 1841–1845.
Thomas Say, Naturalist, 1787–1834.
James Knox Polk, President, 1845–1849.
George Peabody, Philanthropist, 1795–1869.
George M. Dallas, Vice-President, 1845–1849.
Zachary Taylor, President, 1849–1853.
Millard Fillmore, President, 1850–1853.
Samuel F. B. Morse, Inventor, 1791–1872.
John Rutledge, Chief Justice, 1795.
Roger Brooke Taney, Chief Justice, 1836–1864.
Franklin Pierce, President, 1853–1857.
Samuel Houston, Statesman, 1793–1863.
James Buchanan, President, 1857–1861.
Abraham Lincoln, President, 1861–1865.
Hannibal Hamlin, Vice-President, 1861–1865.
Andrew Johnson, President, 1865–1869.
Salmon P. Chase, Chief Justice, 1864–1873.
Joseph Henry, Secretary Smithsonian Institution, 1797–1878.
Ulysses S. Grant, President, 1869–1877.
Charles Wilkes, Commodore, U. S. N., 1798–1877.
Morrison R. Waite, Chief Justice, 1874–1888.
George Bancroft, Historian, 1800–1891.
David G. Farragut, Admiral, U. S. N., 1801–1870.
William Henry Seward, Statesman, 1801–1872.
Ralph W. Emerson, Author, 1803–1882.

Matthew F. Maury, Geographer, 1806–1873.
Robert E. Lee, General, C. S. A., 1807–1870.
Joseph E. Johnston, General, C. S. A., 1807–1891.
Louis Agassiz, Naturalist, 1807–1873.
Henry W. Longfellow, Poet, 1807–1882.
John G. Whittier, Poet, 1807–1892.
Jefferson Davis, Statesman, 1808–1889.
Edgar Allan Poe, Author, 1809–1849.
Oliver Wendell Holmes, Author, 1809–1894.
Asa Gray, Botanist, 1810–1888.
Horace Greeley, Journalist, 1811–1872.
Alexander Stephens, Statesman, 1812–1883.
Stephen A. Douglas, Statesman, 1813–1861.
John C. Frémont, Explorer, 1813–1890.
Rutherford B. Hayes, President, 1877–1881.
James A. Garfield, President, 1881–1881.
Chester A. Arthur, President, 1881–1885.
Grover Cleveland, President, 1885–1889—1893–1897.
Benjamin Harrison, President, 1889–1893.
William McKinley, President, 1897–1901.
David D. Porter, Admiral, U. S. N., 1813–1891.
George G. Meade, General, U. S. A., 1815–1872.
Wade Hampton, General, C. S. A., 1818–1902.
Elias Howe, Inventor, 1819–1867.
James Russell Lowell, Author, 1819–1891.
William T. Sherman, General, U. S. A., 1820–1891.
Spencer F. Baird, Secretary Smithsonian Institution, 1823–1887.
Francis J. Parkman, Historian, 1823–1893.
Thomas J. ("Stonewall") Jackson, General, C. S. A., 1824–1863.
George B. McClellan, General, U. S. A., 1826–1885.
William D. Whitney, Educator, 1827–1894.
Philip H. Sheridan, General, U. S. A., 1831–1888.
Melville W. Fuller, Chief Justice, 1888.
John W. Powell, Geologist, 1834–1902.
Samuel P. Langley, Secretary Smithsonian Institution, 1834–1906.
George Dewey, Admiral, U. S. N., 1837.
H. H. Richardson, Architect, 1838–1886.
John Hay, Statesman, 1838–1905.
Theodore Roosevelt, President, 1901–1909.
William H. Taft, President, 1909—.

PORTRAITS OF EMINENT PERSONS CONNECTED WITH THE HISTORY OF THE PACIFIC COAST AND ALASKA.

Sir Francis Drake, Navigator, 1540–1595.
Meriwether Lewis, Explorer, 1774–1809.
William Clark, Explorer, 1778–1838.
Alexander MacKenzie, Explorer, 1755–1820.
Alexander Baranof, Governor of Russian America, 1790–1819.
John McLoughlin, Governor of Vancouver, 1829–1851.

John H. Kinkead, Governor of Alaska, 1884–1885.
General Lovell H. Rousseau, U. S. A., Military Governor of Alaska, 1867.
Pio Pico, Governor of California, 1845–1846.
George Abernethy, Governor of Oregon, 1845–1849.
George Vancouver, Explorer, 1758–1798.
James Cook, Explorer, 1728–1779.
Thomas Hart Benton, Statesman, 1782–1858.
Lewis Fields Linn, Statesman, 1795–1843.
John Augustus Sutter, Pioneer, 1803–1880.
James Wilson Marshall, Pioneer, 1812–1885.
John White Geary, General, U. S. A., 1819–1873.
Stephen Watts Kearny, General, U. S. A., 1794–1848.
Isaac Ingalls Stevens, General, U. S. A., 1818–1862.
Joseph Lane, General, U. S. A., 1801–1881.
Robert Field Stockton, Commodore, U. S. N., 1795–1866.
Joseph LeConte, Geologist, 1823–1901.
Hubert Howe Bancroft, Historian, 1832—.
John Jacob Astor, Financier, 1763–1848.
Bret Harte, Author, 1839–1902.
John Bidwell, Pioneer, 1819–1900.
Edward Dickinson Baker, Soldier, 1811–1861.
Christopher Carson, Pioneer, 1809–1868.

PORTRAITS OF EMINENT PERSONS CONNECTED WITH THE HISTORY OF THE HAWAIIAN ISLANDS.

Royal Family of Hawaii.

Royal Coat of Arms of Hawaii.
Kamehameha I, 1795–1819.
Queen Kaahumanu, Wife of Kamehameha I.
Kamehameha II, 1819–1824.
Queen Kamamalu, Wife of Kamehameha II.
Kamehameha III, 1824–1854.
Queen Kalama, Wife of Kamehameha III.
Kamehameha IV, 1854–1863.
Queen Emma, Wife of Kamehameha IV.
Kamehameha V, 1863–1872.
King Lunalilo, 1872–1874.
King Kalakaua, 1874–1891.
Queen Kapiolani, Wife of King Kalakaua.
Queen Liliuokalani, 1891–1893.
John O. Dominis, Consort of Queen Liliuokalani.
Princess Likelike (Mrs. A. S. Cleghorn).
Princess Kaiulani (Miss Cleghorn).
Princess Pauahi (Mrs. C. R. Bishop).
C. R. Bishop, Consort of Princess Pauahi.
Prince Kalanianaole.
Prince Hawananakoa.

Americans Prominent in Hawaiian History.

Sanford B. Dole, President of Hawaii, 1894–1898.
John L. Stevens, Diplomat, 1820–1895.
Garritt P. Judd, Statesman, 1803–1873.
Peter J. Gulick, Missionary, 1797–1877.

PORTRAITS OF EMINENT PERSONS CONNECTED WITH THE HISTORY OF THE PHILIPPINE ISLANDS.

Coat of Arms of the Philippine Islands.
William Howard Taft, Statesman, 1857—.
Luke E. Wright, Statesman, 1847—.
José Rizal, Patriot, 1896—.
Emelio Aguinaldo, Soldier, 1870—.
Henry Ware Lawton, General, U. S. A., 1843–1899.
Arthur MacArthur, General, U. S. A., 1845—.
Wesley Merritt, General, U. S. A., 1836—.
James F. Smith, General, U. S. A., 1859—.

HISTORIC SCENES AND LANDMARKS.

Arlington, Home of Lee.
Mount Vernon, Home of Washington.
The Capitol.
The White House.
The Library of Congress.
Independence Hall.
Baptism of Pocahontas.
Marriage of Pocahontas.
First Railroad Train, Perth Amboy, N. J.
Washington's Last Birthday.
General Marion in His Swamp Camp.
Capture of Major André.
Embarcation of the Pilgrims.
The Peace Ball.
Columbus' First Sight of Land.
Battle of Bunker Hill.
First Foreign Recognition of the American Flag.
Henry Hudson in New York Bay.
Funeral Mass on the Mississippi over De Soto.
Columbus at Court of Ferdinand and Isabella.
Burgoyne's Surrender at Saratoga.
Landing of Columbus.
De Soto Discovering the Mississippi.
Declaration of American Independence, July 4, 1776.
Washington and his Generals.
Washington Crossing the Delaware.
Speech of Patrick Henry.
Washington Taking Leave of his Generals at New York.
Franklin at the Court of France.

The Surrender of Cornwallis.

Columbus Caravels, 1492: *Santa Maria, Nina, Pinta.*

Susan Constant—The Ship that brought the First Colonists to Jamestown.

Mayflower.

Miles Standish's Challenge.

Battle between *Serapis* and *Bon Homme Richard.*

Battle of New Orleans.

Arrival of Relief Expedition at Jamestown.

Eliot Preaching to Indians.

Elm Tree under which Penn made Treaty with Indians.

Old Map of Virginia.

Old Map of Fort—1585.

Map of America, 1659, showing the Chesapeake Bay to the St. Lawrence River, including a Small Map of the City of New York as it was in 1659.

Declaration of the Independence of America, July 4, 1776.

Washington delivering his Inaugural Address, April, 1789, New York.

The Hermitage, the Home of Andrew Jackson.

The Hermitage, the Great Central Hall.

The Tomb of Andrew Jackson.

Carpenters' Hall, Philadelphia.

Congress Hall, Philadelphia.

Monticello, Home of Jefferson.

French Embassy at Austin, 1839–1842—Built by Count Dubois de Saligny, French Charge d'Affaires.

Fall of the Alamo in 1836—The Alamo was built in 1716 by Franciscans, and was used as a military fortress, church, school, and residence. At the outbreak of the war between the Republic of Texas and Mexico, it was defended by General Cos. It was captured on December 10 by Generals Milam, Travis, and Burleson with 300 Texans after five days' fighting. On the 6th of March, 1836, Travis, Bowie, and Crockett with 160 men left to garrison it, were attacked by Gen. Santa Anna with 5,000 Mexicans. All of the Texans were killed and the Mexicans lost more than 1,600.

Declaration of Independence (East Wall), enlarged to 7 by 9 feet by photography—This shows with great distinctness the signatures of the signers and the writing in the body of this epochal document.

Oil Painting—Battle of Caloocan, between the American troops and Philippine Insurrectionists. Painted by George Peters.

Signing of the Treaty for the Purchase of Russian America (Alaska), March 30, 1867.

General Lawton Conferring with Admiral Dewey April 21, 1899, Concerning Proposed Route for an Expedition from Manila to the North.

Photograph made near La Loma Church in a Suburb of Manila. Center, Admiral Dewey and General Lawton; left, Maj. C. R. Edwards, Chief of Lawton's Staff; right, Lieut. Frank H. Brumby, Aid of Dewey; rear, Mrs. Lawton.

Honolulu from the "Punch Bowl."

Sacramento in 1849.

San Francisco in 1855.

San Francisco in 1856.

San Francisco in 1864.

Old Russian Blockhouse, built at St. Michael, Alaska, 1833.
Old Russian Gunboat, in the Harbor of St. Michael, Alaska.
Royal Palace, with Birds-eye View of Honolulu.

HISTORY OF THE CAPITOL.

Elevation of James Diamond's Competitive Design.
Front Elevation of Philip Hart's Competitive Design.
View of Capitol when first occupied by Congress in 1800. William Thornton, Architect.
Basement plan, 1800. Plan in Black showing portion first occupied by Congress.
East elevation of design accepted. William Thornton, Architect.
Exterior view from Latrobe's Drawings.
Longitudinal section; Latrobe's Modification of Thornton's plan of the House of Representatives.
West Elevation, 1811 to 1814.
Exterior, after Fire, from Drawing of Crittendon, 1814.
Drawing of House of Representatives after Destruction by the British.
House of Representatives, Southwest View.
Senate Chamber, showing Southwest Gallery.
Perspective View Drawn by George Strickland.
Northwest View of Capitol in 1840.
Southeast View of Capitol in 1840.
Capitol View from President's Mansion, 1840.
Exterior Design Approved by President Fillmore, 1851. Thomas U. Walter, Architect.
East Portico of Wings, 1853. Thomas U. Walter, Architect.
Elevation of New Dome, 1855. Thomas U. Walter, Architect.
Section of Dome Showing Scaffolding and Temporary Roof.
Northeast View as Completed.
Northwest View of Capitol, showing Marble Terrace.
West View of Capitol.
Southeast View of Capitol, showing Marble Terrace.
Design for the Extension of the Central Portion of the Capitol, perspective view. Thomas U. Walter, Architect, 1874.
Chief Justice Marshall. W. W. Story, Sculptor.

HISTORIC VESSELS.

Models of Viking Ship.—Taken from a ship contemporaneous with the voyage of Leif Ericsson, in 1001, to the American continent. It was excavated from a "King's Mound," near Sandefjord, Norway, in 1880, and is now in the Royal Frederick University, at Christiania.

The original is a clinker-built ship, 67 feet long, over all; in width, amidships, 17 feet; depth, 4 feet. Made of oak planking, averaging one inch in thickness, fastened with iron nails, and caulked with oakum made of cow's hair. It had thirty-two oars, twenty feet long, one mast with a square sail, and open deck floored with loose boards. When at the oars, the crew hung their shield to the gunwales. A tent cloth, stretched above in stormy weather, was made of fine woolen texture, white, with red stripes.

In the same mound were found fragments of small oak boats, sleeping berths, cooking utensils, wooden cups and plates. Model made in the United States National Museum. 244,974.

THE "SANTA MARIA."—A caravel-ship, in which Christopher Columbus sailed from Palos, Spain, Friday, August 3, 1492, in company with the open deck vessels, *Nina* and *Pinta,* and landed, October 11, on what was supposed to be the shores of Farther India. The landing place proved to be one of the Bahamas, which Columbus named San Salvador, and now generally conceded to be Watling Island. Sailing southward he discovered Cuba, Haiti, and other islands, which were called the West Indies. He named Haiti "Hispaniola," or "Little Spain." On its northern shore, the *Santa Maria* was wrecked, and with the timbers he built a fort, leaving thirty men for its defense. He set sail in the *Nina* for Spain, January, 1493. Model made in the United States National Museum. 244,931.

THE "SUSAN CONSTANT."—Model of a caravel-built ship of the English type in the early part of the seventeenth century. Length over all, 66 feet; beam, 18 feet. The ship *Susan Constant,* 100 tons, the *God-speed,* 40 tons, and the *Discovery,* 20 tons, sailed from England under command of Captain Christopher Newport, on January 1, 1607, and arrived on the Virginia coast on April 26, bringing one hundred and five planters, the founders of the Jamestown colony. The point where the ships anchored, on April 30, was designated, in thankful spirit, as Point Comfort. The colonists landed at Powhatan, May 13, and established there a settlement which they called "Jamestown." Model made in the United States National Museum. 160,187.

ARROW AND LANCE HEADS AND AX.—Made of stone and used by the Indians during the early colonization of the Province of Virginia, contemporaneously with the *Susan Constant.*

THE "HALF MOON."—Henry Hudson, navigator, born in England about the middle of the 16th Century, offered his services to the Dutch East India Company. On April 6, 1609, he sailed from Amsterdam, in the *Half Moon,* a barge-built ship of 90 tons, to Nova Zembla, to look for a northeast passage. Prevented by the ice barrier, he sailed around the southern shores of Greenland to look for a northwest passage. Repulsed again by the ice, went southward, discovering the American continent off the coast of Maine. He sailed as far south as Virginia, touching at Cape Cod. Returning, he discovered Delaware Bay, and early in September he entered Raritan Bay, and afterward the present harbor of New York, ascending the river as far as Albany. Returning, he followed the coast to Chesapeake Bay and then went back to Holland. In 1610, on his fourth expedition, he discovered the bay that bears his name. On his return voyage to Holland, he and others were seized by mutineers of his own vessel, placed in a small boat, and being set adrift, their fate was never known. Gift of William J. Boyd. 79,181.

THE "MAYFLOWER" OF THE PILGRIMS.—Model of a wooden, caravel-built vessel. Length over all, 82 feet; beam, 22 feet; depth, 14 feet.

The style of ship in which the one hundred and two Pilgrims who settled at Plymouth, Massachusetts, in 1620, made the passage from England to America. Rigged model: Scale, half inch to one foot. Model made in the United States National Museum. 160,161.

THE UNITED STATES FRIGATE "CONSTITUTION."—Built in Boston Harbor, 1794; launched, 1797; ready for sea, March 27, 1798. Length, 204 feet; beam, 43.6 feet; rated a 44-gun frigate; complement in 1798, 500 officers and men. As flagship, in 1799, cruised in southern waters, captured coastwise vessels, and at Porta Plata, cut out a French privateer. She was dismantled in Boston in 1800, participated in the War with Tripoli, 1804-1805. The *Constitution* was overhauled in 1808. Flagship in southern waters in 1809. She sailed to France in 1810 with United States Minister. Overhauled at Washington in 1812 and her armament changed, she sailed in the same year and encountered a British fleet off the coast of New York, escaping capture by kedge-hauling. She captured the British frigate *Guerriere,* August 17, 1812; and December 29, took the 38-gun frigate *Java,* after which she was overhauled in Boston. The chief events of her subsequent career are as follows: Destroyed the *Pictou,* in 1813; blockaded in Boston, in 1814; captured the *Cyane* and the *Levant,* in 1815; laid up in Boston until 1821; was flagship of the Mediterranean squadron, 1822-1825. In 1829, she was ordered to be "broken up and sold," but Holmes' poem, "Old Ironsides," caused the repeal of the order, and she was rebuilt. In 1897, dismantled, she was used as barracks in Boston harbor. By Act of Congress, 1906, she was ordered to be rebuilt on original lines. Model made in the United States National Museum. 237,884.

EARLY AMERICAN STEAMBOATS.

This exhibit shows the most important features in American invention of vessels propelled by steam.

JOHN FITCH'S STEAMBOAT.—Designed by John Fitch, built in Philadelphia in 1786, and first tested on the Delaware River July 27 of that year, when a successful public trial was made. Length, 34 feet; width, 8 feet; depth, 3 feet 6 inches. Equipped with a steam engine which, connected by geared machinery, sprocket wheel and chain, operated six oars placed vertically in a frame on each side of the boat.

In 1788 Fitch completed his first commercial boat for carrying passengers, and it was driven in a similar manner. This boat was 60 feet long and 8 feet wide. She made a trip from Philadelphia to Burlington, about 20 miles, in July, 1788, the longest ever made by any steamboat up to that date. October 12, 1788, the boat took 30 passengers from Philadelphia to Burlington in 3 hours and 10 minutes, a speed of over six miles an hour. In 1790 Fitch built another boat, which attained a speed of eight miles an hour, and continued to run on the Delaware River, carrying passengers and freight, for three or four months. 203,712.

RUMSEY'S STEAMBOAT.—Propelled by jets of water forced out through the stern. Tested on the Potomac River at Shepherdstown, W. Va., 1787. 203,711.

STEAMBOAT "CLERMONT," 1807.—Designed by Robert Fulton, built in the city of New York, and made its first trip from that city to Albany in August, 1807. Length, 175 feet; breadth, 12 feet; depth, 8 feet. Equipped with a single-acting bell-crank engine, 24-inch cylinder, and 4 feet stroke, made by Boulton and Watt in England, which operated the side wheels, 15 feet in diameter. The hull was built with flat bottom, sharp vertical ends, perpendicular sides, being straight on top, open in the middle, and having small cabins at the bow

and stern. This model represents the first experimental boat designed and constructed by Robert Fulton. After making several successful trips it was replaced, in the winter of 1807-1808, by another boat, also called the Clermont, which embodied numerous improvements made by Fulton. 160,302.

STEAMBOAT "PHŒNIX," 1808.—Length, 103 feet 3 inches; width, 16 feet; depth, 6 feet 9 inches. Equipped with paddle wheels driven by a cross-head engine with twin condensing cylinders, 16 inches in diameter, 3 feet stroke. The boiler, set in brickwork, consisted of a cylindrical shell with one return flue. The hull and engines were designed by Colonel John Stevens, and were built under his personal supervision in Hoboken, New Jersey. In the summer of 1808 the Phœnix made a trip from Sandy Hook, New York, to Cape May, New Jersey, the first sea voyage ever made by a steam vessel. Subsequently she ran for a number of years, carrying passengers and freight to various points on the Delaware River, until wrecked at Trenton, New Jersey, in 1814. 160,303.

THE "SAVANNAH"—FIRST STEAMSHIP TO CROSS THE ATLANTIC OCEAN.—Built by Francis Fickett at Corlear's Hook, New York. Launched August 22, 1818. Length, 120 feet; width, 29 feet; depth, 13 feet 6 inches; tonnage, 350. Equipped with one inclined direct-acting, low-pressure engine of 90 horsepower; cylinder, 40 inches in diameter; stroke, 5 feet. Engine built by Stephen Vail at Morristown, New Jersey; boilers by Daniel Dod, Elizabeth, New Jersey. Paddle wheels provided with eight radial arms, so arranged that they could be folded together. The wheels could be unshipped and taken aboard when steam power was not required.

The *Savannah* was originally designed as a sailing ship, to run as a packet between New York and Havre, France, but, before completion, was fitted with paddle wheels and steam engines.

Commanded by Moses Rogers, of New London, Connecticut, the *Savannah* proceeded from New York to Savannah, Georgia, and, on May 22, 1819, sailed thence for Liverpool, where she arrived on June 20. Subsequently she visited Stockholm, St. Petersburg, and other European ports, and returned to Savannah, arriving November 30, 1819. 160,364.

STEAMBOAT "R. F. STOCKTON."—The first vessel with screw propeller and iron hull to cross the Atlantic Ocean, 1839. Machinery designed by John Ericsson. 160,404.

JOHN STEVENS' TWIN-SCREW STEAMBOAT OF 1804.—Fitted with propellers designed in 1844. 160,306.

SIDE-WHEEL STEAMBOAT "GRAY EAGLE."—Mississippi River, 1860. 160,323.

HISTORY OF LAND TRANSPORTATION.

The exhibit illustrates the methods of transporting passengers and supplies, beginning with very primitive devices rudely constructed from materials cut out of the forest, up to the stage coach and railroad locomotive. Among the latter there are:

1. Model of the experimental locomotive made by John Stevens, of Hoboken, New Jersey, in 1825.

2. The Stourbridge Lion, built at Stourbridge, England, which made experimental trips on the tracks of the Delaware and Hudson Canal Company at Honesdale, Pennsylvania, in 1829. The first full-size locomotive ever run in the United States.

3. The John Bull and Train, which was put in service on the Camden and Amboy Railroad, New Jersey, in 1831. This locomotive was kept in use for about thirty years and is still in serviceable condition.

4. Locomotive Best Friend and Train, used on the South Carolina Railroad, in 1832.

5. Other typical locomotives, of later dates.

American Indian Travois.—Used by Indians and Colonists for transporting game, fuel, forage, and persons. 181,254.

Primitive Sledge.—Made from the forked limb of a tree. The American Indians and early settlers of the country commonly used sledges of this form for transporting supplies.

Primitive Sled.—Generally used by the early settlers of the United States, and still in use in some parts of the country.

Tobacco Rolling Hogshead.—Illustrating the method of transporting tobacco; in use throughout Virginia and neighboring States, 1750-1861. 181,259.

"Carreta," or Ox Wagon.—Heavy wheels, composed of three pieces of thick timber held together by dowels of wood. This type of wheel was originated by the Spaniards and is still to be found in Spain. Carts of this style are made by the Pueblo Indians in New Mexico, where they are still in use. 181,308.

Red River Cart.—Vehicles of this form have been extensively used in the Red River country, Dakota, and British America for transporting freight over the northern plains. 181,309.

Modern Farm Cart.—Generally used throughout the United States. 181,490.

American Colonial Chaise.—Vehicles of this description were largely used in New England in Colonial times, and are referred to by Oliver Wendell Holmes in the "Old One Horse Shay." 181,284.

Conestoga Wagon.—Drawn by six or eight horses, and extensively used for transporting merchandise and emigrants from the North and East across the Allegheny Mountains to Wheeling and Pittsburg, en route for the South and West. 184,444.

American Stage Coach, 1825, 1860.—The vehicle used for overland travel and mail conveyance. In general use through the United States from the beginning of the 19th century until superseded by railways. 180,055.

John Stevens' Locomotive, 1825.—The first locomotive in America of which there is a reliable record; built by Stevens and run experimentally on a circular track at Hoboken, New Jersey, during the years 1825, 1826, 1827, and 1828. Model made in the Museum Workshops. 180,241.

Locomotive Tom Thumb, 1829.—Designed and constructed by Peter Cooper, in Baltimore, Maryland, and tested on the Baltimore and Ohio Railroad, August 28, 1829. On that occasion it drew a car carrying 24 passengers a distance of thirteen miles in 72 minutes, and made the return trip in 57 minutes. Model made in the Museum Workshops. 204,581.

Locomotive Stourbridge Lion, 1829.—The first full-size locomotive run on a railroad track in the United States. Built by Foster, Rastrick & Co., in Stourbridge, England. Trial trip made on the Delaware and Hudson Canal

Company's track at Honesdale, Pennsylvania, August 8, 1829. Model made in the Museum Workshops. 215,649.

Locomotive John Bull, 1831.—"Number 1," Camden and Amboy Railroad Company. The oldest complete locomotive in America. (Model.) Built by George Stephenson & Sons, Newcastle-upon-Tyne, England, 1830-'31; shipped from Liverpool, July 14, 1831, on the ship *Allegheny* bound for Philadelphia. Model made in the Museum Workshops.

On November 12, 1831, in the presence of members of the New Jersey Legislature, with Isaac Dripps acting as engineer, in a train with two cars, this locomotive made the first movement by steam in the State of New Jersey, at Bordentown, where the Railroad Monument now stands. The John Bull was in continuous service from 1831 to 1865, during which time it was altered and added to. It was exhibited at the Centennial Exposition, 1876, and at the Exposition of Railway Appliances, Chicago, 1883. It was placed in the U. S. National Museum, 1885, and remained there until 1893, when (April 17-22) it was run under steam from New York to the World's Columbian Exposition, where for a time it made daily trips upon the Exposition tracks. On December 13, 1893, it was returned to Washington, having made the last trip under steam on that date.

Original Dimensions: Weight, 10 tons (22,425 pounds). Boiler, 13 feet long, 3 feet 6 inches in diameter. Cylinders, 9 by 20 inches. Driving wheels, 4 feet 6 inches diameter; cast-iron hubs; locust spokes; tire of wrought iron, shrunk on, flange 1½ inches deep. Sixty-two flues, 7 feet 6 inches long, 2 inches diameter. Furnace, 3 feet 7 inches by 3 feet 2 inches high. Steam ports, 1⅛ by 6½ inches; exhaust ports, 1½ by 6½ inches. Throw of eccentric, 3½ inches. Grate surface, 10.08 square feet. Fire-box surface, 36 square feet. Flue surface, 213 square feet.

Locomotive Best Friend and Train, 1830.—The first locomotive constructed in the United States for actual service on a railroad. Built at the West Point Foundry, in New York City, for the South Carolina Railroad on which its trial trip was made January 15, 1831. Model made in the Museum Workshops. 180,244.

Locomotive Old Ironsides, 1832. (Model).—Built by Matthias Baldwin in Philadelphia. This locomotive hauled the first passenger train in the State of Pennsylvania. Gift of the Baldwin Locomotive Works. 180,114.

Locomotive Sandusky, 1837.—Built by Rogers, Ketchum & Grosvenor, in Paterson, New Jersey, and placed in service on the Mad River and Lake Erie Railroad at Sandusky, Ohio, in 1838. Model made in the Museum Workshops. 180,245.

JOSEPH HENRY'S ELECTRICAL APPARATUS.

This collection illustrates important features in the work done by Professor Henry in his researches in electrical science, and comprises the following:

1. The signaling apparatus and battery used by him in Albany, New York, and Princeton, New Jersey, in 1832, for transmitting signals over wires of various lengths, up to one mile, stretched about his laboratories. By this means he was enabled to ring a bell at the distant end of the line.

2. Two forms of the apparatus by which he produced reciprocating or vibrating motion of a pivoted bar, by the power of the electric current.

3. One of the large magnets made by him for determining the electric power of an electro-magnet. The original machine, of which this is a model, ⅛ size, was made by Henry, for Yale College, and is now deposited in the United States National Museum. Several other machines of this description were made by Henry, but this is the only one that has been preserved.

4. Two induction coils made of flat strips of copper insulated with cloth, used by Henry in his experiments in electro-magnetic induction.

5. Hearder's magnetometer and other pieces of magneto apparatus, used by Henry in his experiments.

Henry's description of the apparatus, and his records of the experiments, were published by the Smithsonian Institution in 1866; see "Scientific Writings of Joseph Henry," volumes 1 and 2.

Galvanic Battery.—Copy of original battery used by Joseph Henry in 1832 to operate his electro-magnetic signaling apparatus. 181,322.

Henry's Electro-magnetic Signaling Apparatus.—Reproduction of apparatus devised by Joseph Henry and used by him in 1831 at Albany, New York, in sending signals through one mile of wire. 181,323.

Henry's Reciprocating Electro-magnetic Apparatus.—Copy of apparatus devised and used by Joseph Henry in 1831. 181,324.

Henry's Reciprocating Electro-magnetic Apparatus.—Reproduction of apparatus devised and used by Joseph Henry in 1831. 244,904.

Henry's "Yale" Magnet, 1831.—Large magnet, made by Henry for Yale College—model one-eighth size of original, which is in the National Museum. This apparatus was operated by two small cells of battery and used for determining the lifting power of the electro-magnet, which was between 2,000 and 3,000 lbs. 181,763.

Induction Coil.—Devised and used by Joseph Henry in his researches in electro-magnetic induction. 181,546.

Induction Coil.—Devised and used by Joseph Henry in his researches in electro-magnetic induction. 181,547.

Hearder's Magnetometer.—Used by Joseph Henry in his experiments and researches in electrical science. 181,488.

Magneto Wheel.—Used by Joseph Henry in his experiments and researches in electrical science. 181,444.

Magneto Wheel.—Used by Joseph Henry in his experiments and researches in electrical science. 181,445.

Magneto-electric Apparatus.—Used by Joseph Henry in his experiments and researches in electrical science. 181,743.

Magneto Bell.—Used by Joseph Henry in his experiments and researches in electrical science. 181,477.

THE MORSE TELEGRAPH.

This exhibit illustrates the beginning and development of the electro-magnetic telegraph, and includes the following:

1. A model, one-half size, of the first instrument, which was made by Morse in 1837. It recorded the messages in zigzag lines made by a pencil on a strip of paper.

2. A crude apparatus, made in 1844, with which the Morse characters were embossed on a strip of paper by a steel point.

3. The recording apparatus used on the first commercial line, connecting Washington and Baltimore, opened for public business May 24, 1844. The record made by this instrument was similar to that made by No. 2. It originally had three steel points, and made three identical records.

4. A later type of recording apparatus, an improved form of embossing register, made about 1850.

5. An improved apparatus, introduced about 1880, in which the record is made in ink.

6. Various forms of telegraph-transmitting keys and relays.

7. One form of repeaters which were used for automatically repeating messages from one line to another. The principle of this apparatus was one of Morse's early discoveries.

Morse Telegraph Register, 1837.—Model, half size, of the first electromagnetic receiving telegraph instrument. The original recorded the Morse signals in zigzag lines on a strip of paper drawn underneath the pencil by clockwork. It can be placed on any Morse telegraph line and used for receiving messages by sound. Made by S. F. B. Morse and first exhibited in New York city, September 2, 1837. 181,765.

Copy of Morse Telegraph Register.—The original instrument was made by James Green, about 1844, and used on a private line connecting the residence and the school of Reverend Henry Schieb, in Baltimore. 181,764.

Morse Telegraph Register, 1844 (Copy of original).—The original is one of the receiving instruments used on the telegraph line built by S. F. B. Morse, under the auspices of the Government, connecting Washington and Baltimore, and formally opened May 24, 1844. The line was operated by Professor Morse in the U. S. Capitol building, at the Washington end of the line, and by Alfred Vail in the Baltimore office. 221,482.

Morse Telegraph Register.—A type of telegraph-receiving apparatus, operated by clockwork with a cord and weight, which embosses the Morse characters on a paper strip. Made by Knox and Shain, Philadelphia, and extensively used between 1845 and 1875. 216,045.

Morse Telegraph Ink Recorder.—A form of receiving instrument which superseded the apparatus by which the Morse characters were embossed on a paper strip by a steel point and which makes the record in ink. First used about 1880. 181,118.

Morse Telegraph Key, 1840. 181,769.

Morse Telegraph Key, 1844. 181,770.

Morse Telegraph Key, 1846. 181,171.

Morse Telegraph Key, 1890. 181,119.

Morse Telegraph Relay, 1846. 181,422.

Morse Telegraph Relay, 1858. Made by J. Rodgers, New York. 181,421.

Morse Telegraph Relay, 1895. Made by E. S. Greeley Company, New York. 181,117.

Morse Sounding Relay, 1880. 181,375.

Morse Telegraph Sounder, 1856. Made by J. J. Clark, Philadelphia. 181,424.

Milliken Automatic Telegraph Repeater.—Repeaters of this type were first used in Portland, Maine, in 1862, on the lines of the American Telegraph

Company, between Boston, Massachusetts, and Calais, Maine. They were extensively used in the United States up to 1895. 181,378.

Morse Telegraph Instruments, Key, Relay, and Sounder.—Used at the Electrical Exposition in New York city, May 16, 1896, on the lines of the Postal Telegraph Cable Company, in transmitting a message around the world; sent by Chauncey M. Depew to E. D. Adams—Albert B. Chandler, sending operator; Thomas A. Edison, receiving operator. 181,427.

MEDALLIC HISTORY OF THE UNITED STATES.

Presidents of the United States.

Bronze copies of medals struck in honor of the Presidents and for presentation to Indian chiefs in token of peace and friendship. From the U. S. Mint.

Thomas Jefferson.—March 4, 1801, to March 4, 1809. Born October 30, 1735; died July 4, 1826.

James Madison.—March 4, 1809, to March 4, 1817. Born March 16, 1751; died June 28, 1836.

James Monroe.—March 4, 1817, to March 4, 1825. Born April 28, 1759; died July 4, 1831.

John Quincy Adams.—March 4, 1825, to March 4, 1829. Born July 11, 1767; died February 23, 1848.

Andrew Jackson.—March 4, 1829, to March 4, 1837. Born March 15, 1767; died June 8, 1845.

Martin Van Buren.—March 4, 1837, to March 4, 1841. Born Dec. 5, 1782; died July 24, 1862.

William Henry Harrison.—March 4, 1841, to April 4, 1841. Born Feb. 9, 1773; died April 4, 1841.

John Tyler.—April 4, 1841, to March 4, 1845. Born March 29, 1790; died Jan. 18, 1862.

James Knox Polk.—March 4, 1845, to March 4, 1849. Born Nov. 2, 1795; died June 15, 1849.

Zachary Taylor.—March 5, 1849, to July 9, 1850. Born Nov. 24, 1784; died July 9, 1850.

Millard Fillmore.—July 10, 1850, to March 4, 1853. Born Jan. 7, 1800; died March 8, 1874.

Franklin Pierce.—March 4, 1853, to March 4, 1857. Born Nov. 23, 1804; died Oct. 8, 1869.

James Buchanan.—March 4, 1857, to March 4, 1861. Born April 22, 1791; died June 1, 1868.

Abraham Lincoln.—March 4, 1861, to April 14, 1865. Born Feb. 12, 1809; died April 15, 1865.

Andrew Johnson.—April 15, 1865, to March 4, 1869. Born Dec. 29, 1808; died July 31, 1875.

Ulysses Simpson Grant.—March 4, 1869, to March 4, 1877. Born April 29, 1822; died July 23, 1885.

RUTHERFORD B. HAYES.—March 5, 1877, to March 4, 1881. Born Oct. 4, 1822; died Jan. 17, 1893.

JAMES ABRAM GARFIELD.—March 4, 1881, to Sept. 19, 1881. Born Nov. 19, 1831; died Sept. 19, 1881.

CHESTER ALAN ARTHUR.—Sept. 19, 1881, to March 4, 1885. Born Oct. 5, 1830; died Nov. 18, 1886.

GROVER CLEVELAND.—March 4, 1885, to March 4, 1889; March 4, 1893, to March 4, 1897. Born March 18, 1837; died June 24, 1908.

BENJAMIN HARRISON.—March 4, 1889, to March 4, 1893. Born Aug. 20, 1833; died March 13, 1901.

WILLIAM MCKINLEY.—March 4, 1897, to Sept. 14, 1901. Born Jan. 29, 1843; died Sept. 14, 1901.

THEODORE ROOSEVELT.—Sept. 14, 1901, to March 4, 1909. Born Oct. 27, 1858.

DIRECTORS AND SUPERINTENDENTS OF THE U. S. MINT.

H. R. LINDERMAN, Director of U. S. Mint, 1867-1869. From U. S. Mint. 75,327.

HORATIO C. BURCHARD, Director of U. S. Mint, 1879-1884. From U. S. Mint.

ROBERT M. PATTERSON, Director of U. S. Mint, 1835-1851. From U. S. Mint. 75,525.

OLIVER C. BOSBYSHELL, Superintendent of U. S. Mint, 1889-1894. From U. S. Mint.

DANIEL M. FOX, Superintendent of U. S. Mint, 1885-1889. From U. S. Mint.

EDWARD O. LEECH, Director of U. S. Mint, 1889-1893. From U. S. Mint.

JAMES P. KIMBALL, Director of U. S. Mint, 1885-1888. From U. S. Mint.

HON. JAMES POLLOCK, Superintendent of U. S. Mint, 1869-1879. From U. S. Mint. 75,324.

A. LOUDON SNOWDEN, Director of U. S. Mint, 1853-1861. From U. S. Mint. 75,326.

MEDALLIC PORTRAITS OF EMINENT AMERICANS.

GILBERT STUART.—Born 1755; died 1828.

WILLIAM WINDOM.—Born 1827; died 1891.

HENRY WARD BEECHER.—Born 1813; died 1887.

ALEXANDER HAMILTON.—Born 1757; died 1804.

GEORGE WASHINGTON.—Born 1732; died 1799.

LOUIS AGASSIZ.—Born 1807; died 1873.

JOSEPH HENRY.—Born 1799; died 1878.

JOSEPH PANCOAST.—Born 1805; died 1882.

HENRY CLAY.—Born 1777; died 1832.

ULYSSES S. GRANT.—Born 1822; died 1885.

ABRAHAM LINCOLN.—Born 1809; died 1865.

War of the Revolution.

Bronze copies of gold medals conferred by act of Congress on officers of the Army for distinguished services in the War of the Revolution. From the U. S. Mint.

Major Henry Lee.—Act of Sept. 24, 1779, for surprise of Paulus Hook, Aug. 19, 1779. From U. S. Mint. 75,247.

Colonel William A. Washington.—Act of March 9, 1781, for Battle of the Cowpens, Jan. 17, 1781. From U. S. Mint. 75,230.

General Nathanael Greene.—Act of Oct. 29, 1781, for Battle of Eutaw Springs, Sept. 8, 1781. From U. S. Mint. 75,274.

General Anthony Wayne.—Act of July 26, 1779, for storming of Stony Point, July 15, 1779. From U. S. Mint.

Captain John Paul Jones.—Act of Oct. 16, 1787, for capture of *Serapis*, Sept. 23, 1779. From U. S. Mint. 75,248.

Lieutenant-Colonel John Edgar Howard.—Act of March 9, 1781, for Battle of Cowpens, Jan. 17, 1781. From U. S. Mint. 75,229.

General George Washington.—Act of March 25, 1776, for recovery of Boston, March 17, 1776. From U. S. Mint. 75,226.

General Daniel Morgan.—Act of March 9, 1781, for Battle of the Cowpens, Jan. 17, 1781. From U. S. Mint. 75,228.

Lieutenant-Colonel De Fleury.—Act of July 26, 1779, for storming of Stony Point, July 15, 1779. From U. S. Mint.

General Horatio Gates.—Act of Nov. 4, 1777, for surrender of Burgoyne at Saratoga, Oct. 17, 1777. From U. S. Mint. 75,227.

War of 1812-14.

Bronze copies of gold medals conferred by act of Congress on officers of the Army and Navy for distinguished services in the War of 1812-14. From the U. S. Mint.

Captain Isaac Hull.—Act of Jan. 29, 1813, for capture of British frigate *Guerriere*, 1812. From U. S. Mint. 75,250.

Captain William Bainbridge.—Act of March 3, 1813, for capture of British frigate *Java*. From U. S. Mint. 75,253.

Captain Jesse Duncan Elliott.—Act of Jan. 6, 1814, for Battle of Lake Erie, Sept. 10, 1813. From U. S. Mint. 75,258.

General Alexander Macomb.—Act of Nov. 3, 1814, for Plattsburg, Sept. 11, 1814. From U. S. Mint. 75,240.

Captain Lewis Warrington.—Act of Oct. 20, 1814, for capture of British brig *Epervier*, April 29, 1814. From U. S. Mint. 75,259.

Captain Charles Stewart.—Act of Feb. 22, 1816, for capture of British ships *Cyane* and *Levant*, 1815. From U. S. Mint. 75,265.

Colonel George Croghan.—Act of Feb. 13, 1835, for defense of Fort Stephenson, Aug. 2, 1813. From U. S. Mint. 75,231.

Captain Stephen Decatur.—Act of Jan. 29, 1813, for capture of British frigate *Macedonia*, Oct. 25, 1812. From U. S. Mint. 75,252.

Lieutenant Edward Rutledge McCall.—Act of Jan. 6, 1814, for capture of British sloop *Boxer,* Sept. 4, 1813. From U. S. Mint. 75,256.

Captain Johnston Blakeley.—Act of Nov. 3, 1814, for capture of British sloop *Reindeer,* 1814. From U. S. Mint. 75,260.

Captain James Biddle.—Act of Feb. 22, 1816, for capture of British sloop *Penguin,* March 23, 1815. From U. S. Mint. 75,264.

General Jacob Brown.—Act of Nov. 3, 1814, for Chippewa, Niagara, Erie, July-Sept., 1814. From U. S. Mint. 75,237.

General Peter Buel Porter.—Act of Nov. 3, 1814, for Chippewa, Niagara, Erie, July-Sept., 1814. From U. S. Mint. 75,236.

Captain Oliver Hazard Perry.—Act of Jan. 6, 1814, for Battle of Lake Erie, Sept. 10, 1813. From U. S. Mint. 75,257.

General Eleazer Wheelock Ripley.—Act of Nov. 3, 1814, for Chippewa, Niagara, Erie, July-Sept., 1814. From U. S. Mint. 75,239.

Captain Thomas Truxton.—Act of March 29, 1804, for Battle with French frigate *La Vengeance,* Feb. 23, 1800. From U. S. Mint. 75,249.

Commodore Edward Preble.—Act of March 3, 1805, for seige of Tripoli, July 25-Sept. 18, 1804. From U. S. Mint. 75,266.

Captain Jacob Jones.—Act of Jan. 29, 1813, for capture of British sloop *Frolic,* Oct. 18, 1812. From U. S. Mint. 75,251.

Captain Oliver Hazard Perry.—By State of Pennsylvania, for Battle of Lake Erie, Sept. 10, 1813. From U. S. Mint. 75,294.

General James Miller.—Act of Nov. 3, 1814, for Chippewa, Niagara, Erie, July-Sept., 1814. From U. S. Mint. 75,238.

General Winfield Scott.—Act of Nov. 3, 1814, for Chippewa, Niagara, Erie, July-Sept., 1814. From U. S. Mint. 75,234.

Lieutenant Stephen Cassin.—Act of Oct. 20, 1814, for Battle of Lake Champlain, Sept. 11, 1814. From U. S. Mint. 75,263.

Lieutenant William Burrows.—Act of Jan. 6, 1814, for capture of British sloop *Boxer,* Sept. 4, 1813. From U. S. Mint. 75,255.

Captain James Lawrence.—Act of Jan. 11, 1814, for capture of British sloop *Peacock,* Feb. 24, 1813. From U. S. Mint. 75,254.

General Edmund Pendleton Gaines.—Act of Nov. 3, 1814, for Battle of Erie, Aug. 15, 1814. From U. S. Mint. 75,235.

Captain Robert Henley.—Act of Oct. 20, 1814, for Battle of Lake Champlain, 1814. From U. S. Mint. 75,262.

Captain Thomas MacDonough.—Act of Oct. 20, 1814, for Battle of Lake Champlain, Sept. 11, 1814. From U. S. Mint. 75,261.

General Andrew Jackson.—Act of Feb. 27, 1815, for Battle of New Orleans, Jan. 8, 1815. From U. S. Mint. 75,241.

General William Henry Harrison.—Act of April 4, 1818, for Battle of the Thames, Oct. 5, 1813. From U. S. Mint. 75,232.

Governor Isaac Shelby.—Act of April 4, 1818, for Battle of the Thames, Oct. 5, 1813. From U. S. Mint. 75,233.

Commemorative Exposition Medals.

New Haven Celebration, 1838.—Commemorating bi-centennial anniversary of founding of town of New Haven, 1638.

International Congress of Geographical Societies, Paris, 1875.—Type of medal awarded for exhibition at the Congress.

International Exhibition, Philadelphia, 1876.—Commemorating 100th anniversary of the Declaration of American Independence.

Albany Celebration, 1888.—Commemorating bi-centennial anniversary of charter of town of Albany, 1688.

Columbian Exposition, Madrid, 1892.—Obverse; Return of Columbus. Reverse; First View of the New World.

Columbian Exposition, Chicago, 1893.—Commemorating 400th anniversary of the discovery of America by Christopher Columbus.

Louisiana Purchase Exposition, 1904.—Commemorating 100th anniversary of the purchase of the Louisiana Territory.

Miscellaneous Medals.

United Colonies Medal.—Commemorating 100th anniversary of the Declaration of Independence. From U. S. Mint.

Life-saving Medal.—Act of June 20, 1874, for gallantry in saving lives at sea. From U. S. Mint. 75,269.

Life-saving Medal.—Act of Feb. 24, 1873, to Captain Crandall and crew of the Long Island Light Station for saving passengers from wreck of S. S. *Metis*. From U. S. Mint.

Commander Duncan N. Ingraham.—Act of Aug. 4, 1854, for rescue of Martin Koszta. From U. S. Mint. 75,268.

Japanese Embassy Medal.—Commemorating first Japanese embassy to United States. From U. S. Mint. 75,271.

Washington Medal Cabinet.—Commemorating installation of Washington Cabinet of Medals at U. S. Mint, Feb. 22, 1868. From U. S. Mint. 75,319.

Life-saving Medal.—Act of July 26, 1866, for rescue of passengers from steamship *San Francisco*, January, 1854. From U. S. Mint. 75,301.

Dr. Frederick H. Rose.—Act of May 11, 1858, for care of yellow fever patients on U. S. S. *Susquehanna*. From U. S. Mint. 75,272.

Great Seal of United States.—Bronze copies of first U. S. seal. From U. S. Mint.

Life-saving Medal.—Act of March 3, 1847, to British, French, and Spanish officers and crews, for rescuing crew of U. S. brig-of-war *Sommers* off Santa Cruz, December 7, 1846. From U. S. Mint.

Captains Creighton, Low, and Stouffer.—Act of July 26, 1866, for rescue of passengers from the S. S. *San Francisco*, January, 1854. From U. S. Mint. 75,300.

Cornelius Vanderbilt.—Act of January 28, 1864, for gift of S. S. *Vanderbilt* to U. S. Government in 1861. From U. S. Mint. 75,302.

George F. Robinson.—Act of March 1, 1871, for saving life of William H. Seward. From U. S. Mint. 75,312.

General Winfield Scott.—From Commonwealth of Virginia for services in War with Mexico. From U. S. Mint. 75,296.

General Winfield Scott.—Act of March 9, 1848, for Mexican campaign 1847. From U. S. Mint. 75,245.

Cyrus W. Field.—Act of March 2, 1867, for laying Atlantic cable. From U. S. Mint. 75,308.

Commodore M. C. Perry.—From merchants of Boston for diplomatic expedition to Japan in 1854. From U. S. Mint. 75,257.

St. Nicholas Society, 1903.—Commemorating 250th anniversary of proclamation of New Amsterdam Municipal Government, 1653. Gift of St. Nicholas Society. 219,186.

Monnier's Metallurgical Company.—Struck from first copper produced in Colorado, 1866.

General U. S. Grant.—Act of December 17, 1863, for Fort Donelson, Vicksburg, and Chattanooga. From U. S. Mint. 75,246.

General Zachary Taylor.—Act of May 9, 1848, for the Battle of Buena Vista, February 22, 23, 1847. From U. S. Mint. 75,244.

Order of Kamehameha.—Hawaiian order founded in 1864 by Kamehameha V in honor of Kamehameha I. Insignia: White enameled cross with gold rays, surmounted by a gold crown. Device: E Hookanaka, "Be a man."

HISTORY OF AMERICAN CARTOGRAPHY.

Globe of the Period of Discovery.

Behaim Globe.—Facsimile of globe constructed by Martin Behaim of Nuremberg in 1492, embodying the current scientific views of the period concerning the geography of the world. Europe, Asia, and Africa are the only continents that appear. The Atlantic ocean stretches unbroken, save for a few islands, from England to the coast of Japan. The national flags here and there indicate discoveries already made. This globe illustrates the knowledge on which Columbus based his plans for a westward sea route from Europe to India. U. S. National Museum Collection. 202,093.

Early Maps of the West Coast.

Section of Map of the World, 1508.
Section of Map of the World, 1537.
Map of the World, Antwerp, 1574.
Map of North America, Amsterdam, 1632.
Map of North America, Paris, 1655.
Map of North America, Paris, 1669.
Map of North America, Amsterdam, 1696.
Map of North America, Amsterdam, 1700.
Map of North America, Amsterdam, 1720.
Map of North America, Paris, 1722.
Map of North America, Amsterdam, 1733.
Map of North America, London, 1740.
Map of North America, Nuremberg, 1746.
Map of the World, Paris, 1753.

Map of the World, Paris, 1754.
Map of North America, Paris, 1771.
The Russian Discoveries in America, London, 1775.
Map of North America, London, 1775.
Map of North America, London, 1787.
Map of North America, London, 1787.
Map of North America, London, 1794.
The Explorations of Mackenzie, London, 1801.
Map of the United States, showing Routes of Explorers, Early Roads and Highways.

HISTORY OF THE TERRITORIAL EXPANSION OF THE UNITED STATES.

Map showing the Territorial Expansion of the United States, 1800–1900.
Facsimiles of Treaties concerning Territorial Expansion of United States, 1800–1900. Originals in Department of State, Washington, D. C.
Treaty concerning Purchase of Louisiana, 1803.
Treaty concerning Joint Occupation of Oregon, 1818.
Treaty concerning Purchase of Florida and Cession of Spanish Claims on the Pacific Coast, 1819.
Treaty concerning Russian Claims on Pacific Coast South of 54° 40′ N. Lat., 1824.
Treaty concerning Final Settlement of Oregon Question, 1846.
Treaty concerning Cession of California and New Mexico, 1848.
Treaty concerning Gadsden Purchase, 1853.
Treaty concerning Purchase of Russian America (Alaska), 1867.
Treaty concerning Cession of Philippines, Guam, and Porto Rico, 1898.
Treaty concerning the Samoan Islands, 1900.
Joint Resolution of Congress Annexing Hawaiian Islands to the United States, 1898. Original in Department of State, Washington, D. C.

Early California Newspapers. Originals in California State Library.

Front Page of the First Paper ever Published in California.
Pages of the *Daily Alta California* Announcing Admission of California as a State in 1850.
Section of Page of *Alta California* for March 1, 1849, Announcing Arrival of First Steamship at San Francisco.
Draft of Proclamation to People of California, from Stephen W. Kearny's journal of the Santa Fe and California expedition, 1846. Original in possession of the Missouri Historical Society.

HISTORY OF PACIFIC COAST AND ALASKA.

History of California Missions.

The California Missions.—The California Missions were religious settlements, established under the sovereignty of Spain, for the christianization and civilization of the Indians.

The center of the settlement formed the mission building, usually a quadrilateral structure, eighty or ninety yards in front and about as deep, built in

form of a hollow square, the church representing the façade, with the priests' quarters and the houses for the natives forming the wings. The interior formed a court (*patio*), which was often adorned with trees and fountains, and was surrounded by galleries and colonnades. Upon it opened all the apartments, those of the missionaries, stewards, guests, as well as the schools, workshops, and storehouses. A part, separated off and called the monastery, was reserved for the Indian girls, where they were instructed by native women in spinning, weaving, sewing, etc., while the boys were instructed in various crafts and trades. Around the mission building rose the dwellings of the Indian families. At various distances were the Indian villages (*rancheria*), which were ministered to from the mission and often had a chapel (*assistentia,* or *visita*).

Each mission was directed by two priests, one of whom had control of the internal affairs and the religious instruction, while the other superintended the field labor.

Mission settlements were first started by Jesuit priests, who, between 1697 and 1767, established eighteen missions in Lower or Old California, now a province of Mexico. Upon the expulsion of the Jesuits in the latter year, the care for the missions and the conversion of the Indians in the Spanish colonies were entrusted to the Franciscans. Under the lead of Father Junipero Serra and his successors, the Franciscans founded, between 1769 and 1823, twenty-one mission settlements in Upper or Alta California, the present State of California, extending from Sonoma in the north to San Diego in the south. With the passing, in 1822, of California from Spanish sovereignty to the Republic of Mexico, the decline of the mission set in, and in 1834 their secularization was declared.

Mission Santa Barbara.—Santa Barbara Mission was founded in 1786 on the site called by the Indians *Taynayan,* by the Spaniards *Pedragoso,* and dedicated to Saint Barbara, virgin and martyr. The process of erecting buildings went on till about the end of the 18th century. The church building was at various times enlarged; but in consequence of the damage done by the earthquake of 1812, the original adobe building had to be taken down. On its site rose the present structure, which was dedicated in 1820. It is 165 feet long, 40 feet wide, and 30 feet high, and covered with tiles. The walls, which are six feet thick, consist of irregular sandstone blocks, and are further strengthened by buttresses of 9 by 9 feet. The towers, to a height of 30 feet, are of solid masonry, 20 feet square.

The general style of architecture of Santa Barbara is, like that of most of the mission buildings, Romanesque, blended with Moresque characteristics, such as the open court, with its garden and fountain, the fine corridors facing the court.

Santa Barbara was noted for its excellent buildings, its successful instruction of the Indians in agriculture and the industrial arts, and for raising large herds. During the period of its existence as a mission, from 1786 to 1834, there took place 5,679 baptisms, 1,524 marriages, and 4,046 deaths. The small cemetery to the right of the church building is said to contain the bodies of 4,000 Indians, as well as a number of whites. In the northeast corner is the vault in which are buried the Franciscan priests.

Santa Barbara escaped most of the ravages consequent upon the secularization. In 1842 it became for a time the residence of the first Catholic bishop of California. It is still kept up by the Franciscans, who are its custodians.

Scale: 1 inch to 5 feet.

Model of wood, made under the supervision of W. H. Holmes, by H. W. Hendley and I. B. Millner.

Paintings of California Missions. Lent by T. J. Richardson, Artist.

Adobe, Oldtown, near Mission San Diego, 1880.
Mission San Gabriel in 1890.
Ruined Arches, San Juan.
Mission San Luis Rey in 1890.
San Luis Rey Mission, Rear View.
Side Ruins, San Luis Rey.
Old Adobes near Santa Barbara Mission.
Looking into the Corridor, San Juan, 1890.
The Kitchen, San Juan Mission, 1890.
Mission San Juan, 1890, Sunday Morning.
The Chapel, looking through the Arches, San Juan, 1890.
Mission San Fernando, 1890.
Santa Barbara Mission, 1890.
San Diego Mission in 1890.
In the Corridor, San Juan, 1890.
Santa Barbara, 1889.
The Chapel, San Juan.
Camulos Ranch, 1880.
Santa Barbara, 1889.

Paintings, Etc., Lent by G. Wharton James.

Santa Barbara Mission. The Christening of a Spanish Baby, about eighty years ago. By Alex. F. Harmer.

San Carlos Carmelo Mission, at Monterey. By W. L. Judson. (Before restoration.)

San Carlos Carmelo Mission, at Monterey. (Restored.) By Charles H. Grant.

The Steps to the Choir Gallery at San Gabriel Mission. By Carl Ahrens.

Mission San Antonio de Padua. By Carl Ahrens.

The Façade of the San Diego Mission. By Carl Ahrens.

The Ruins of San Luis Rey Mission. By W. L. Judson.

San Buena Ventura Mission and its Indian Dwellings and Worships around the Patio. (Before restoration.) By Chris Jorgensen.

The Ruins of San Diego Mission. By Alex. Fownsier.

Palou's Life of Junipero Serra, Mexico, 1787.

Objects Lent by the Rev. P. J. Farelly, Pasadena.

Two Volumes History of the Franciscan Order; volume 1 published in 1568, volume 2 published in 1577.

One Antwerp Breviary, 1785.

Two Pieces of Vestments worn by Serra.

Illuminated Missal, undoubtedly earlier than the Twelfth Century.

Manuscript: A daily record of the particular examination of conscience of one of the California Franciscan Monks; his name is on the last page but one.

First Edition of the Antwerp Roman Catechism, 1587.

Ritual, Madrid, 1787.

All of these books were used by the Franciscan Monks in California.

David Tenier's Painting of Saint Augustine. From the Mission of Santa Inez.

Relics from Mission San Jose. Lent by the Dominican Sisters of Mission San Jose.

1 large Statue of San Buena Ventura.

1 Statue of "Ecce Homo."

3 large wooden Altar Candlesticks.

2 smaller wooden Altar Candlesticks.

1 Matraca (rattle).

1 Set of Bells on Wheel (one segment of wheel gone).

3 Altar Cards in Frames.

2 Red and Blue and Gold Candlestick Covers.

1 Set Vestments, White and Gold, consisting of 1 Chasuble, 1 Cover, 1 Burse, 1 Stole, 1 Wample.

1 Red Chasuble.

1 old embroidered White Cape.

1 Set Pink Vestments, consisting of 1 Cover for Chalice, 1 Burse, 1 Wample, 1 Stole.

1 Purple Cape.

1 Set Purple Vestments, consisting of 1 Chasuble, 1 Maniple, 1 Burse, 2 Chalice Covers, 3 Candle Covers.

1 Set Gold and White Vestments, consisting of 1 Chasuble, 1 Maniple, 1 Chalice Cover, 1 Burse, 1 Stole, 2 Candle Covers.

Relics from Santa Clara Mission. Lent by Rev. R. J. Gleeson, S. J.

1 Crucifix used by Padre Serra, from San Carlos at Monterey.

1 Statue of San Juan the Evangelist.

1 Lavabo for Washing Priest's Hands before Mass.

1 Incense Mortar.

1 Ancient Choral from Spain, made and bound in 15th Century.

1 Missal Stand made of one piece of wood.

1 Sermon by the first Bishop of California, preached at Independence of Mexico from Spain.

1 Missal of the Burial Service of the Jesuits.

1 Altar Card Frame.

1 Altar Candlestick.

1 Paschal Candlestick.

Painting of the old Santa Clara Mission, by A. P. Hill.

Ancient Painting, Miracle of the Loaves and Fishes, brought from Spain, and being in old Santa Clara Mission.

A part of the old Altar of Santa Clara Mission, giving the Tabernacle.

Watsonville. Lent by Father Commissary of the Franciscans.

A full Habit of the Franciscan Order, consisting of Gown, Girdle, and Rosary.

Relics from Mission of San Miguel. Lent by Rev. William Power.

1 Iron for making Holy Wafers for Sacrament.
1 Silver Processional Cross.
1 Set of Vestments, White and Purple, consisting of 1 Chasuble, 1 Stole, 1 Burse, 1 Maniple.
1 Humeral Veil.
1 old Maniple, much worn.

Case of Photographs by H. C. Tibbitts. Lent by the Southern Pacific Railroad Company.

The Russian Orthodox Church in Alaska.

Map of Alaska, Showing, in Red, Russian Settlements and Churches.—The Russian branch of the Orthodox Eastern Church was first introduced into Alaska by Russian emigrants from Siberia in the middle of the Eighteenth Century. In 1792 the Holy Synod of Russia began to send missionaries to Alaska, who erected the first Orthodox Church on American soil on Kodiak Island. In 1840 the Rev. John Veniaminoff was installed under the name of Innocent, as the first Russian Bishop. He built the cathedral at Sitka, established a seminary for the education of the clergy, and organized an ecclesiastical consistory for the government of the Alaskan Church. According to a statement in the Russian Orthodox *American Messenger* of March, 1907, there were under the jurisdiction of the present bishop, Innocent Fustinsky, a clergy of forty persons, and ten thousand three hundred and forty-three adherents of the Orthodox faith. These were organized into fifteen parishes, and included, besides Russians and other Slavs, Creoles, Indians, Aleuts, Eskimo, and other nationalities.

The Russian Orthodox Church.—Russia received Christianity from Constantinople in the 10th century A. D., and its church forms a branch of the Eastern Church, also called the Greek Catholic, the Orthodox Greek, or, briefly, the Orthodox Church, its full title being the Holy Oriental Orthodox Apostolic Church, which separated from the Western Church in 1054. The Russian Church agrees in doctrine with the other branches of the Orthodox Church. It recognizes the Bible and tradition as rules of faith. It has, in common with the Roman Catholic Church, seven sacraments, viz., baptism, chrism (confirmation), penance, eucharist (the Lord's Supper), ordination, marriage, and extreme unction, besides the sacrifice of the mass, the religious veneration of Mary, the saints, images, relics, and the cross, the hierarchical degrees and monasticism.

Contrary to the Roman Catholic Church, it adheres only to the decrees of the first seven councils. It teaches the procession of the Holy Ghost from the Father alone. It denies the dogmas of the immaculate conception of Mary, and of the supremacy and infallibility of the Roman pontiff, and rejects the doctrine of purgatory, of works of supererogation and indulgences. Baptism is administered by threefold immersion; chrism is conferred immediately after baptism by a priest (not by a bishop); in communion, both bread and wine are given to the laity, and even to infants, the bread being put into the wine; extreme unction is performed on the sick, not on the dying, and fasts are kept on Wednesday and Friday.

The clergy are divided into two classes: The black clergy (so called from

their dress) or monks, and the white or secular clergy. The former live in celibacy, and from among them are chosen the higher hierarchical grades—the patriarchs, metropolits, archbishops, and bishops. The secular clergy, comprising popes (priests), deacons, subdeacons, and readers, must be married before receiving orders, but cannot marry a second time.

The Russian St. Michael's Cathedral at Sitka, Alaska.—The Cathedral was erected in 1848. It is built in form of a cross, surmounted by a cupola, and provided with a belfry which carries eight bells varying in weight from 75 to 1,500 pounds. The interior is, like that of all Orthodox churches, divided into three parts, the vestibule or entrance on the west, the nave or main body of the church for the worshipers, and the sanctuary or altar space facing east. The latter is raised above the nave, and is divided from it by a partition, called iconostas (image stand), which is adorned with twelve icons, or images, of Christ, the Virgin Mary, St. Michael, etc., in chased massive silver casings. The iconostas has three openings; the doors of the middle one, called the "sacred" or "royal gates," through which, at certain stages of the service, the eucharist, the Gospels, and the cross are brought out to be adored by the worshipers, are decorated with artistic carvings and crowned by an icon representing the Last Supper in silver casing. In the center of the sanctuary stands the altar, consisting of a table covered with linen and costly brocade, with its appurtenances, viz., the antiminsion—that is, a piece of cloth about fifteen inches square stamped with a representation of the burial of Christ and the busts of the four Evangelists, without which no church can be consecrated and no mass performed—the cross made at Bethlehem, and the Gospels in a splendid binding, incrustated with French paste diamonds, and with small icons in mother-of-pearl. To the left of the altar is the table of oblations, on which are the silver-gilt vessels for the preparation of the eucharist.

On either side of the altar are chapels, having their own altars and icons, that on the left being consecrated to Our Lady of Kazan, that on the right to John the Baptist and Alexander Nevsky.

There are no benches in Russian churches, the people standing during service. No organ or any other instrumental music is permitted, but the mass is generally accompanied by choral singing.

The Cathedral has a membership of 770 persons, the majority of which are Indians.

Model of wood, made under the supervision of the Rev. A. P. Kashevaroff, Dean of the Cathedral, by Mr. Shergen.

Photographs of Alaskan-Russian Churches and Clergy.

The Principal Churches and Clergy of the Russian Orthodox Church in America.

Russian Church at Unalaska, on the Aleutian Islands, Alaska. The church was built by the Rev. John Veniaminoff, who arrived at Unalaska in 1824, and later, under the name of Innocent, became first Bishop of Alaska.

Russian Church at Unalaska, on the Aleutian Islands, Alaska. View of the interior.

Russian Church at Juneau, Alaska. View of the interior.

Rev. A. Yaroshevich, Priest of the Russian Church at Juneau.

The Students of the Russian Theological Seminary at Sitka, Alaska, with Revs. A. P. Kashevaroff and Seraphim in the center.

St. Michael's Society, a church organization of St. Michael's Cathedral at Sitka, Alaska. To the right is seen the flag of the United States. In the center is the banner of the Society.

Reverend Nikita, Priest of the Russian Church at Kenai, Alaska.

Rev. Peter Kashevaroff, Priest of the Russian Church on St. George's Island, Alaska.

Archbishop Tikhon, Eighth Russian Bishop of Alaska, 1898–1903.

Bishop Nicholas, Seventh Russian Bishop of Alaska, 1891–1898.

Bishop Nestor, Fifth Russian Bishop of Alaska, 1879–1882.

Bishop Innocent, in his Episcopal Vestments and Insignia, and with the Pastoral Staff, or Crozier. First Russian Bishop of Alaska, 1840–1859. Died as Metropolitan of Moscow in 1879.

The Russian Orphanage, Sitka, Alaska.

Russian Bishop's Staff. It terminates at the top in two serpents (in allusion to Matthew x: 16) bent into a handle in form of an anchor, the emblem of hope. Below the handle is a piece of white silk, suggesting a parasol. Original in the St. Michael's Cathedral, Sitka, Alaska.

Bishop's Mitre, with Dykire and Trikire; that is, candlesticks, one holding two candles, the other three, symbolizing the two natures in Christ and the Trinity, respectively. The mitre of gold cloth and the candlesticks of silver are in the St. Michael's Cathedral at Sitka, Alaska.

Vessel for Blessing the Five Loaves. On the night preceding high festivals five loaves, in memory of the miraculous feeding of the five thousand, and three vessels, holding wheat, wine, and oil, respectively, are blessed in the church. Original of silver in the St. Michael's Cathedral at Sitka, Alaska.

Censer. Incense is frequently used during the service in the Orthodox Church. Original of silver in the St. Michael's Cathedral at Sitka, Alaska.

Candelabra. Lights are kept burning in Russian churches during service on the altar, on the table on which the Eucharist is prepared, and in front of the icons or images. Originals of silver in St. Michael's Cathedral at Sitka, Alaska.

Russian Cathedral of St. Michael at New York, N. Y.

Russian Church at Kadiak, on Kodiak Island, Alaska.

Russian Church at Kadiak, on Kodiak Island, Alaska. View of the interior.

Russian Church on St. George's Island, Alaska.

Russian Church at Athognak, Alaska.

Russian Church at Seldovia, Alaska.

Russian Church on St. Paul's Island, Alaska.

Russian Church on Nushagak River, Alaska.

Russian Church on Nushagak River, Alaska. View of the interior.

Russian Church on St. Paul's Island, Alaska.

Russian Church on St. Paul's Island, Alaska. View of the interior.

Bishop Paul, with two Priests. Bishop Paul, 1867–1870, was the Third Russian Bishop of Alaska.

Bishop Peter, Second Russian Bishop of Alaska, 1859–1867.

St. Michael's Cathedral at Sitka, Alaska.

St. Michael's Cathedral at Sitka, Alaska. View of the interior.

Rev. Andrew P. Kashevaroff, Dean of St. Michael's Cathedral at Sitka, Alaska.

Silver Model of St. Michael's Cathedral at Sitka, Alaska. Used as the ark or tabernacle for holding the elements of the Eucharist.

Panagia (that is, small image of Christ and Mary) and Pectoral Cross. Worn by bishops on the breast outside the robes. Originals of gold in St. Michael's Cathedral at Sitka, Alaska.

Icon of Christ, cased in silver-gilt so as to represent the robes. Original in the sanctuary of St. Michael's Cathedral at Sitka, Alaska.

Church Banner. Banners with the image of Christ, Mary, or some saint in the center are hung up in Russian churches and carried in religious processions. Original of silk in St. Michael's Cathedral at Sitka, Alaska.

Rev. T. Shalamanoff, Priest of the Russian Church at Kadiak, on Kodiak Island, Alaska.

Russian Church on St. Paul's Island, Alaska.

Head of Christ, with silver ornaments. Original in St. Michael's Cathedral at Sitka, Alaska.

Orthodox Bishop's Crozier, made of metal, terminating at the top in two serpents (Matthew x: 16) bent into a handle, giving it the appearance of an anchor, the emblem of hope. Below the handle is a piece of silk in form of a parasol. Original in St. Michael's Cathedral at Sitka, Alaska.

Religious Books, Etc.

Euchology, or Book of Common Prayer of the Orthodox Church, containing the liturgies and prayers used in private worship as well as in the public services of the church. Translated from Slavic by G. V. Shann. Printed in Kidderminster, 1891. Sitka, Alaska. Lent by Rev. A. P. Kashevaroff.

Octoëchos, or Book of Eight Tones.—Containing the commemorations or collects for each day of the week, viz: Sunday of the resurrection, Monday of the angels, Tuesday of John the Baptist and the other prophets, Wednesday of Mary, Thursday of the apostles and St. Nicholas, Friday of the cross, and Saturday of the Saints. They are sung in eight varied tones, covering a cycle of eight weeks, hence the name Octoëchos. Translated from the Slavic by Professor N. Orloff. Printed in London, 1898. Sitka, Alaska. Lent by Rev. A. P. Kashevaroff.

Liturgies of St. Chrysostom, St. Basil the Great and of the Presanctified, in Greek and English. Edited by J. N. W. B. Robertson, London, 1894. The liturgies used in the Russian Church belong to the Byzantine rite. There are three liturgies in this rite: That of St. John Chrysostom, Patriarch of Constantinople (died 407 A. D.), that of St. Basil the Great, Bishop of Caesarea in Cappadocia (died 379 A. D.), and that of St. Gregory Dialogos (Pope Gregory I, 590-604), also called the liturgy of the presanctified. The two latter are used only on special days, while that of St. Chrysostom is the ordinary liturgy. The liturgical language in the Russian Church is old-Slavic, an archaic form of the Russian language. Printed in London, 1894. Sitka, Alaska. Lent by Rev. A. P. Kashevaroff.

Horologion, or Book of Hours.—Containing the daily devotions for the stated or canonical hours (matins, prime, tierce, sext, vesper, compline). Translated from the Slavic *Chasaslov* by Professor N. Orloff. Printed in London, 1897. Sitka, Alaska. Lent by Rev. A. P. Kashevaroff.

Book of Needs.—Containing the prayers and services performed on various occasions, such as churching of a woman, baptism, marriage ordination, visiting the sick, burial. Translated from the Slavic *Trebnik* by G. V. Shann. Printed in London, 1894. Sitka, Alaska. Lent by Rev. A. P. Kashevaroff.

Manual of the Services of the Orthodox Church.—Containing a description of the services, rites, and ceremonies of the Greek Orthodox Church. Compiled by Arch-Priest D. Sokoloff. Translated from the Russian. Printed in New York and Albany, 1899. Sitka, Alaska. Lent by Rev. A. P. Kashevaroff.

The Gospel of Matthew in the Russian and Aleut-Lisefsky languages. The Russian is on the right, the Aleut-Lisefsky on the left side of the page. The translation into the Aleut-Lisefsky tongue was made by the Rev. John Veniaminoff (later, under the name of Innocent, first Russian Bishop of Alaska) in 1828, revised by him in 1836, and finally adapted by the Rev. Jacob Netzvyetoff to the dialect of the natives of Atkha Island in the Aleutian chain. Printed in St. Petersburg, 1896. Sitka, Alaska. Lent by Rev. A. P. Kashevaroff.

The Gospel of Matthew in Slavic and the Chugatch-Aleut language. The Slavic is on the right, the Chugatch-Aleut on the left side of the page. The translation into the Chugatch dialect was made by N. Tishnoff in 1848. Printed in St. Petersburg, 1848. Sitka, Alaska. Lent by Rev. A. P. Kashevaroff.

A Sketch of Bible History, in form of questions and answers, in the Russian and Tlinkit Indian languages. The Russian is on the right side, the Tlinkit Indian on the left. The translation into the Tlinkit Indian dialect was made by the Rev. Vladimir Donskoy. Printed in New York, 1901. Sitka, Alaska. Lent by Rev. A. P. Kashevaroff.

Religious Primer in the Aleutian dialect. By Archbishop Innocent, who first introduced Orthodox Christianity into the Aleutian Islands. Printed in St. Petersburg, 1893. Sitka, Alaska. Lent by Rev. A. P. Kashevaroff.

Primer of Christian Instruction.—Containing an abstract of Biblical history and the catechism in the Aleut-Lisefsky dialect. By Bishop Innocent. Printed in St. Petersburg, 1893. Sitka, Alaska. Lent by Rev. A. P. Kashevaroff.

"The Way to the Kingdom of Heaven."—A religious tract by Archbishop Innocent. Translated into the Indian-Kolosh dialect by S. I. Kostromitinoff. Printed in Sitka, Alaska, 1901. Sitka, Alaska. Lent by Rev. A. P. Kashevaroff.

Prayers and Hymns in the Russian and Indian Kolosh languages, the former on the left side, the latter on the right. The translation into the Kolosh dialect was made by Ivan Nadezhdin. Printed in San Francisco, 1896. Sitka, Alaska. Lent by Rev. A. P. Kashevaroff.

Prayers and Hymns in the Russian and Anglomute-Kuskovin languages. The former is on the left side, the latter on the right. Printed in San Francisco, 1896. Sitka, Alaska. Lent by Rev. A. P. Kashevaroff.

Prayers in the Tlinkit Indian Dialect.—Translated from the Russian by Rev. Vladimir Donskoy. Printed in Sitka, 1895. Sitka, Alaska. Lent by Rev. A. P. Kashevaroff.

Prayers and Hymns in the Russian and Anglomute-Kuskovin languages.

The former is on the left side, the latter on the right. Printed in San Francisco, 1896. Sitka, Alaska. Lent by Rev. A. P. Kashevaroff.

Prayers and Hymns in the Eskimo Tongue.—Translated from the Russian by Rev. Jacob Netzvyetoff. Printed in 1896. Sitka, Alaska. Lent by Rev. A. P. Kashevaroff.

Thanksgiving Day Service, as celebrated in the Orthodox Church. Published in San Francisco, California, Thanksgiving Day, 1901. Dedicated to the President of the United States and to the American People. Sitka, Alaska. Lent by Rev. A. P. Kashevaroff.

Description of St. Michael's Cathedral in Sitka, Alaska, and its affiliated institutions, in Russian and English. Printed in New York, 1899. Sitka, Alaska. Lent by Rev. A. P. Kashevaroff.

"Russian Orthodox American Messenger."—Being the supplement of March, 1907, to the "Amerikanskiy Pravoslavny Vyestnik." It contains a sketch by Bishop Innocent on the establishment of the Russian Church in Alaska, and on its present condition. Printed in New York. Sitka, Alaska. Lent by Rev. A. P. Kashevaroff.

Life of Innocent, First Russian Bishop in Alaska.—Translated from the Russian. Innocent, originally John Popov, was born in the town of Anginskoe in the government of Irkutsk in 1797. At the age of nine he entered the clerical seminary at Irkutsk, where he was given the name of Veniaminoff. In 1817 he was ordained a deacon and a year later a priest. In 1824 he arrived as a missionary at Unalaska in the Aleutian Islands where he first established the Orthodox Church. He translated parts of the Scriptures and the liturgy into the Aleutian dialect, for which he created the alphabet. In 1834 he was transferred to the Port of New Archangel, now Sitka. In 1840 he was consecrated first bishop of Alaska, and in 1850 he was raised to the dignity of archbishop of Kamchatka, the Kuriles, and the Aleutian Islands, and in 1867 he was elected metropolitan of Moscow, which is the highest dignity in the Russian Church. Died in 1897. Sitka, Alaska. Lent by Rev. A. P. Kashevaroff.

Padlock.—Spring bolt moved by a screw key. Russian ironwork. The padlock was used on the door of the Greek Cathedral at Sitka for forty years. Lent by Lieut. G. T. Emmons, U. S. N.

Church of Jesus Christ of Latter Day Saints (Mormon Church).

Portraits of Persons Connected with the Church.

President Joseph Smith, born at Sharon, Vermont, December 23, 1805; died at Carthage, Illinois, June 27, 1844. Founder of the Church of Jesus Christ of Latter Day Saints.

Brigham Young (1801–1877), Founder of Utah and Second President of the Church.

John Taylor (1808–1887), Preacher, Writer, and Third President of the Church.

Wilford Woodruff (1807–1898), Pioneer, and Fourth President of the Church.

Lorenzo Snow (1814–1901), Fifth President of the Church.

Joseph F. Smith (born 1838), Sixth and Living President of the Church.

Patriarch Hyrum Smith (1800–1844), Brother of Joseph Smith, with whom he was associated in the Founding of the Church.

Heber C. Kimball (1801–1868), Pioneer, and First Counselor to President Brigham Young.

The Three Pioneer Women, Harriet Page Wheeler Young, Clara Decker Young, and Ellen Sanders Kimball. These were the only women in the Pioneer Company, and were respectively the wives of Lorenzo D. Young, Brigham Young, and Heber C. Kimball.

General Daniel H. Wells (1814–1891), First Commander of the Utah Militia and for ten years Mayor of Salt Lake City.

General Charles C. Rich (1809–1883), Colonizer in Utah, Idaho, and Southern California.

Orson Pratt (1811–1881), Pioneer, Theologian, and Mathematician. Mr. Pratt made the original survey of Salt Lake City, the Parent City of the Inter-Mountain Region.

George A. Smith (1817–1875), Pioneer, Colonizer, and Church Historian.

Jedediah M. Grant (1816–1856), First Mayor of Salt Lake City.

Erastus Snow (1818–1888), Pioneer, Colonizer, and Statesman.

George Q. Cannon (1827–1901), Editor, Orator, Congressman, and for over twenty years one of the first Presidents of the Church.

Parley P. Pratt (1807–1857), Colonizer, Preacher, and Poet.

Amasa M. Lyman (1813–1877), Pioneer of Utah, and Colonizer of Southern California.

Franklin D. Richards (1821–1899), Editor and Church Historian.

Willard Richards (1804–1854), First Editor of the "*Deseret News*," and First Postmaster of Salt Lake City.

Orson Hyde (1805–1878), Editor and Colonizer.

Ezra T. Benson (1811–1869), Pioneer and Colonizer.

Joseph F. Smith, John R. Winder, and Anthon H. Lund, now the First Presidency of the Church.

John Smith, the Present Patriarch of the Church.

The Present Presiding Bishopric of the Church.

The Present Twelve Apostles of the Church.

The First Council of Seventy; the Third General Quorum of the Church.

Collection of Works and General Literature, Prose, and Poetry.

ALBUM.—Containing illustrations of Temples, Churches, Schools, Homes, Public Buildings, and other structures built by the Latter Day Saints in Utah and the surrounding region.

ALBUM.—Containing portraits of prominent Mormons, men and women, connected with the reclamation of the Arid West.

HISTORICAL SKETCH.—Showing the migrations and achievements of the Mormon people from the State of Vermont to the Pacific Coast.

THE BOOK OF THE PIONEERS (in two volumes).—A compilation authorized by the Utah Jubilee Commission (July, 1897), and presented to the State of Utah as a souvenir of the semi-centennial celebration of the arrival of the Pioneers upon the shores of the Great Salt Lake. It contains the names of

the Original Pioneer Company and many of those who arrived in Salt Lake Valley immediately after them; also autographs and brief biographical sketches of over seven hundred of the Veterans who struck the first blow in the redemption of the Great American Desert. The volumes are handsomely bound in leather and in native metals, including silver and gold. Its production cost about $1,000.

Historic Relics of the Church of Latter Day Saints.

Maps of Sections of the United States.—These maps show the migrations of the Mormon people and illustrate the influence of the Mormon Church in the development of the West.

Bulletin of the Plains.—The Pioneers, while crossing the plains in 1847, occasionally used the skull of a dead buffalo as an improvised post office, in which to deposit messages for their friends who followed them. This exhibit illustrates an incident of that historic journey.

The Pioneer Odometer.—This machine was invented by two of the Pioneers who crossed the Great Plains in 1847, and was used by Brigham Young and his company to measure the distance from the Missouri River to Salt Lake Valley. The difference between the measurements made with this instrument and those made by the Government surveyors, who subsequently passed over the route, was less than 60 feet.

The Pioneer Printing Press.—Upon this press was printed (June 15, 1850) the initial number of the "*Deseret News*," the first newspaper published in the Rocky Mountain region. This paper, originally a weekly, then a semi-weekly, and now a daily, wields a powerful influence throughout the Inter-Mountain West.

The Book of Mormon Press.—Upon this press was printed the first edition of the Book of Mormon, believed by the Latter Day Saints to be the Bible of the Western Hemisphere, and equal in authority to the Hebrew Scriptures, the Bible of the Orient. The original edition of 5,000 copies was published for Joseph Smith by Egbert B. Grandin at Palmyra, New York, in 1830.

Plaster Model of the Salt Lake Temple.—This great edifice is built mainly of native granite, quarried from the Wasatch Mountains, the huge blocks, prior to the coming of the railroad, being carried by ox teams a distance of twenty miles. The Temple cost about four million dollars and required forty years (from 1853 to 1893) for its construction.

First Paper Money in the West.—These bills were issued at Salt Lake City just prior to the organization of the Provisional Government of the State of Deseret. An attempt had previously been made to coin gold dust, but the crucibles used in the process broke, and paper money was then issued. The first bill—one dollar—bore the date of January 1, 1849. The issue was authorized by a body known as the Municipal Council, which was then attending to the public business.

Model of the Salt Lake Tabernacle (showing interior in detail).—The Tabernacle is a vast elliptical dome, resting upon forty-four buttresses of solid masonry. Between these buttresses are twenty large double doors opening outward and affording speedy egress. The building is 250 feet long, 150 feet wide, and 80 feet high; the concave ceiling, 70 feet from the floor, being arched without pillar. The acoustic properties of the hall are marvelous:

a pin dropped at one end of the hall may be heard distinctly at the other end, over 200 feet away. The seating capacity is slightly under 8,000, although 10,000 people can crowd into the building. The Tabernacle organ, built originally of native timber by Utah workmen, and recently enlarged, is one of the great pipe organs of the world.

PHOTOGRAPHS OR SPECIMENS OF THE COINS OF DESERET.—These coins were issued by the Provisional State of Deseret, the first civil government in the Rocky Mountain Region, organized in March, 1849, and continuing until April, 1851, when it was merged into the government of the Territory of Utah. The coins in question were of unalloyed virgin gold, and were designed merely for local use. The crucibles and dies used in the minting were made at Salt Lake City, and the metal came from the newly-opened California gold mines. They were not intended to supersede the Government coins, and, when legal money became available, they were called in and disposed of as bullion to the Federal Mints.

ABORIGINES OF THE SOUTHWESTERN UNITED STATES.

MODERN PUEBLOS OF ARIZONA AND NEW MEXICO.

FAMILY GROUP OF THE ZUNI INDIANS.—The Zuni Indians live in pueblos near the western border of New Mexico. They were visited at the beginning of the 16th century by the earliest Spanish explorers, and have been a subject of study by ethnologists for many years. They dress in woolen clothing, are agriculturists as well as herdsmen, and make excellent blankets and pottery. At the same time they are devoted to their ancient religion.

This group includes in the foreground the belt weaver, a young woman engaged in weaving one of the artistic belts used for the waist. At the right is seated an old man occupied in drilling a bit of stone with the ordinary pump drill; his dress is that worn during the Spanish period. On the left of the group stands a young girl in the usual costume, who has just returned from the spring, bearing upon her head a water vessel. In the middle are two children interested in their frugal meal.

MODEL OF THE HOPI PUEBLO, WALPI, NORTHEASTERN ARIZONA.—Walpi is one of the more important pueblos of the Hopi Indians who live in Northeastern Arizona. It takes the name, "Place of the Gap," from the configuration of a high table-land, or mesa, upon which it is situated. The top of the mesa is about 500 feet above the level of the plain. It is totally destitute of vegetation and without water. The sides of the mesa are terraced and in places precipitous, the approaches to the village upon it being by steep trails.

Walpi was settled on its present site shortly after the year 1680, having been previously established on the terrace a hundred feet below the top. The original settlers belonged to the Bear and Snake families, the former of which came from Jemez, New Mexico, the latter from near Navajo Mountain, near the Colorado River. The first buildings erected by these families are situated at the ends of the space midway the east side of the pueblo. The increase of these clans and the addition of new rooms to the ancestral buildings finally joined them, forming a row of buildings on the front of the pueblo about midway in its length. The first house on the west side of Walpi was erected by the Flute People, a group of clans that originally came from southern Arizona. The line of rooms formed by the increments to this house is sepa-

rated by a court from the main part of Walpi. The buildings in the southern portion of the pueblo were constructed by the Rain Cloud, Tobacco Land, and other clans, many of which were late additions to the population. The ancestors of the majority of these came from villages—now ruins—in southern Arizona.

Two kinds of rooms may be recognized in the model. There are many living rooms and five ceremonial rooms, or kivas. The former are huddled into clusters; the latter are isolated in the plazas. At the highest point the main cluster of rooms is made up of four stories. There are two plazas, one of which, situated near the south end, is enclosed by buildings and contains two kivas; the other is open on the east side midway in its length. In the latter, indicated in the model by an eroded pinnacle called the Antelope Rock, occurs biennially the celebrated Hopi Snake Dance. The secret rites of this dance are performed in the two kivas in the south plaza.

The model represents aboriginal Walpi about twenty years ago, before the introduction of innovations due to contact with white men.

Scale: 5 feet to 1 inch.

Modeled by Victor and Cosmos Mindeleff.

ANCIENT PUEBLOS OF ARIZONA AND NEW MEXICO.

Casa Grande Ruins, Pinal County, Arizona.

Birds-eye View of the prehistoric ruin called Casa Grande, situated in the desert, a mile south of the Gila River, approximately 50 miles southeast of Phœnix and 12 miles west of Florence. This ruin is typical of many others in southern Arizona, comprising blocks of buildings, reservoirs and ditches, fortified inclosures, and other structures, together with refuse-heaps and burial mounds. The land occupied by the ruin, approximately a mile square, constitutes a Government reservation, which is in charge of a resident custodian under the direction of the Secretary of the Interior.

The main building—the historic Casa Grande—was uninhabited at the close of the 17th century, when first visited by Spanish missionaries. The date of its settlement and the cause of its devastation are unknown. The inhabitants are supposed to have been ancestors of the Pima and of certain Pueblo clans.

The original settlement was composed of rectangular structures, to which the name Compounds has been given, and of blocks of buildings, types of which are represented in the accompanying models. Their relative positions are shown in the painting. These Compounds were devoted to public purposes, as defense, communal ceremonies, markets, and granaries. Some of the buildings were used for the performance of secret rites; others may have been habitations of medicine men or of chiefs. In the spaces between the buildings probably stood the fragile walled huts of the former inhabitants.

The excavation and repair of Casa Grande were conducted by the Smithsonian Institution, an appropriation having been made by Congress for the purpose.

Painted by Mr. Spencer B. Nichols.

The Casa Grande Reservation is about a mile square, situated in Pinal County, Arizona, a mile south of the Gila River and twelve miles west of Florence, the county seat. Much of this area is covered by mounds, in the midst of which lies the historic building called, in 1694, by its discoverer, the

Jesuit Father Eusebio Francisco Kino (Kuehne), Casa Grande, or Great House.

The so-called Casa Grande mounds are of several types—refuse heaps, pyral mounds or burying places, buildings covered with earth, a reservoir with high banks, and irrigation canals. The typical form of building is a rectangular area surrounded by a massive wall enclosing single rooms and blocks of houses. Five of these rectangular areas, called compounds, have been more or less completely excavated. Scattered over the Reservation are also small mounds with indications of clusters of rooms, called Clan Houses. There are also small, low mounds showing evidences of dwellings, with fragile walls which were formerly supported by upright logs.

These compounds may be known as Compounds A, B, C, and D.

Compounds are supposed to have been communal structures erected for defense, for celebration of ceremonies, or for storage of crops. The former chiefs of the settlement may have dwelt in them, and they sometimes contain habitations of the people.

An oil painting in the vicinity of the models shows the relative position of the different compounds, buildings, and unexcavated mounds in the Reservation.

The excavation and repair of the mounds on the Casa Grande Reservation were made in 1906 and 1907 by the Smithsonian Institution with special appropriations by Congress for that purpose.

Models were constructed by Mr. H. W. Hendley under direction of Dr. J. Walter Fewkes, of the Bureau of American Ethnology, who was in charge of the field work.

Compound A.—The largest in the Casa Grande group, measures 420 by 215 feet, and is oriented 3 degrees east of the true north and south. Its surrounding wall, now averaging 4 feet high, was formerly 7 feet, and had one or more ports. In addition to the historic building, Compound A contains over fifty rooms, four large plazas, and several courts. These rooms, as a rule, formerly served for ceremonial purposes, for protection, or for granaries.

The main building measures 60 feet long by 42 feet wide and 30 feet high. It consists of four stories, the lowest constructed of consolidated adobe. Casa Grande formerly had eleven rooms—two, one above another, on each side, and three similarly arranged in the central area. The region outside the base was probably occupied by a terrace.

The cluster of rooms in the southwest angle of the compound was originally a building two stories high, but the east walls of the upper story are worn away, while the west walls of two rooms still stand at their former elevation.

Six rooms, each one story high, extend in a row from the northeastern angle of the main room to the north wall. These were ceremonial rooms, corresponding to the estufas or kivas of the Pueblo Indians.

There are remains of the wall of a rectangular room east of the main building, indicating a building formerly two stories high, its east wall having fallen. This room, which had floor and roof in 1775, is called Font's room, from the Jesuit missionary, Father Pedro Font, who first mentioned and described it. The block of rooms adjoining the east walls covered more ground than any other in the compound.

The majority of the rooms were entered from the roof by means of hatchways, but lateral entrances were also sometimes used. The roofs of those

rooms nearest the main buildings were on a level with the floor of the lowest rooms of the historic Casa Grande.

Models were constructed by Mr. H. W. Hendley under direction of Dr. J. Walter Fewkes, of the Bureau of American Ethnology, who was in charge of the field work.

Clan House A.—The block of rooms, designated Clan House A, is situated 740 feet east of Compound A. It is probably the central building in a compound, the outer wall of which has not yet been traced. This building measures 113 feet east and west by 49 feet on the north and south sides.

It has thirteen rooms and a single enclosed plaza, entered from a middle room. There are two large additional rooms, called the Annex, situated on the east side.

All the rooms of Clan House A were formerly one story high, the majority being entered by ladders from their roofs.

The general character of the rooms, as well as the objects found in them, indicate that this building was ceremonial rather than domiciliary.

In the middle of the central room is a massive seat made of clay facing an offset into the room from the west wall.

The room of the annex adjoining the north wall is a mortuary chamber, an adult skeleton having been found in a specially prepared burial place at one side. The outer wall of this room was decorated with symbolic figures in red.

Compound B.—This compound, lying 800 feet northeast by north of Compound A, measures 300 feet on the east side. It is oriented a few degrees east of north.

Compound B contains numerous buildings that may be arranged in three types: (1) Massive-walled rooms; (2) fragile-walled habitations, and (3) subterranean rooms. The first type is strongly built of consolidated adobe. The walls of the fragile habitations have for the most part fallen, on account of the decay of the upright logs which formerly supported them.

The best example of subterranean rooms is situated near the northeast angle of the compound, beneath the foundation of the walls.

The two large rectangular mounds in Compound B were terraced like pyramids, and had buildings on their summits, the floor and fireplaces of which are evident. These mounds are constructed of superimposed strata separating floors at intervals from their summits to their bases. Five of these floors were found in the largest mound.

The open spaces situated within the enclosures and west of the large mound were covered with fragile-walled habitations, as indicated.

Compounds C and D.—Compound C is situated a few hundred feet west of Compound B, and is a rectangular area with surrounding wall, enclosing small habitations, the walls of which were supported by logs.

Compound D, situated a few hundred feet east of Compound B, is rectangular in shape, surrounded by a wall which enclosed not only small habitations, but also a massive walled central building with many rooms.

About midway between Compounds A and B there is a large circular reservoir, surrounded by a bank of earth rising a few feet above the plain.

Numerous irrigation ditches can be traced in the plain west of Compounds A and B.

Cliff Palace, Mesa Verde National Park, Colorado.—Cliff Palace, the largest known cliff dwelling, is situated in Cliff Canyon, in the Mesa Verde

National Park. This park, containing many cliff dwellings, varying in size from a single room to a large village, has been set aside by Congress for the protection of these ruins, and a superintendent appointed to take charge of them under the direction of the Secretary of the Interior.

The characteristics of a cliff dwelling are shown in the accompanying model of Mummy Cave.

The painting shows the present dilapidated condition of Cliff Palace, the most picturesque ruin in the United States. Many of the walls have been broken down or intentionally overthrown; the rooms have been filled with fallen debris and their floors dug into and otherwise mutilated. This destruction has occurred mainly since the discovery of Cliff Palace by white men in 1888.

The nearest railroad station to Cliff Palace is Mancos, Colorado, where guides can always be obtained by those wishing to visit it.

Painted by Mr. Spencer B. Nichols from a photograph.

Model of a Cliff Dwelling Called Mummy Cave Ruin, Northeastern Arizona.—Mummy Cave Ruin, called by the Navaho Indians Tseiyakin, was so named because the mummy of an infant was found in it. It is situated in Canyon del Muerto, a tributary of Canyon de Chelly in Northeastern Arizona.

The inhabitants of this cliff dwelling were ancestors of some of the clans now living among the Hopi Indians, the habitation having been deserted in comparatively recent times.

Mummy Cave Ruin lies in the shelter of two recesses about 300 feet above the bed of the stream, and consists of two sections, an eastern and western, connected by a ledge 110 feet long by 20 feet wide. The eastern recess is about 200 feet across and 100 feet deep; the western about 100 feet across and 75 feet deep.

The western section is inaccessible except by the connecting ledge, which is approached from the east. Its ground plan shows from fourteen to twenty-five rooms. A row of ten rooms can be traced on the connecting ledge, which is wholly occupied by these buildings. The eastern section contains the most rooms. The majority are rectangular in shape, but there are three or four circular rooms that are identified as ceremonial chambers and may be called kivas.

The rooms of the eastern part number about fifty, which, with those in the western section, make a few less than ninety. The majority of these were habitations, but many were for storage, and some served as granaries. A few of the eastern rooms stand three stories high and have their roofs still intact. One of these chambers, which resembles a tower, has beams projecting from three sides.

The rooms of the western part are comparatively large and are evidently habitations; those of the ledge range from 10 to 15 feet wide. Some of these were formerly more than one story high. The front wall, now much broken and buried under fallen masonry, was exceptionally massive. It formed the outer border of the plazas and served as a retaining wall, rendering entrance into the cliff-dwelling impossible except at certain places.

The ceremonial rooms, or kivas, are enclosed in rectangular chambers, their tops being at the same level as adjacent plazas. The entrance was by a ladder through the middle of the roof, which is now destroyed. Each kiva had a

ventilator, by which fresh air was introduced at the floor-level by means of a vertical passage opening in the plaza. The wall of one kiva was decorated with a white band, on which was painted a meander design colored red.

Scale: 5 feet to 1 inch.

Modeled by Cosmos Mindeleff.

ABORIGINES OF CALIFORNIA.

FAMILY GROUP OF THE HUPA INDIANS.—The Hupa Indians inhabit the valley of the same name in northwestern California. They represent in the series of family groups the mixed tribes of California and Oregon. Physically, the Hupa stands between the large-bodied Sioux and the under-sized Pueblo Indians. In language they belong to the Athapascan family, in common with the Tinne of Canada and the Apache and Navajo of Arizona. They live on a mixed diet of meat, fish, and acorns; dress in skins, and are fond of personal ornament in shell-beads and fringes of seeds. Their houses are of cedar planks, and the floor is slightly sunken. An important industry among them is harvesting, transporting, storing, and milling acorns, together with the preparation of food from the meal.

In this group the man is making fire with the twirling drill, the standing woman carries a load of acorns just gathered, and the sitting woman is pulverizing acorns in a basket mill. The base of this basket is open and rests on the shallow stone mortar, on which the acorns are reduced to meal.

CALIFORNIA.

Photographs by U. S. Fish Commission.

McCloud River Indian Spearing Salmon. Baird, California.
Chinese Joss House in a Camp. San Francisco, California.
Kloochy, McCloud River Indian Chief in War Costume. Baird, California.

HISTORY OF BRITISH COLUMBIA.

PHOTOGRAPHS BY U. S. FISH COMMISSION.

Graveyard of the Haida Indians. Alert Bay, British Columbia.
Interior of Haida Indian Communal House. Fort Rupert, British Columbia.

THE ABORIGINES OF THE NORTH PACIFIC COAST AND SOUTHEASTERN ALASKA.

ARTS OF THE NATIVE TRIBES, NORTH PACIFIC COAST OF AMERICA.

WOOD CARVING AND PAINTING.—The Indian tribes ranging from Puget Sound to southeastern Alaska have developed a remarkable and comparatively uniform culture which extends to mythology, but not to language. Their skill in wood carving is very great, and the decoration of their carvings in natural pigments is of unique interest and shows a surprising aptitude for design and color. The chests, totem posts, and masks exhibited, were made with simple tools, and express the serious art of these tribes. The masks, while usually of mythological beings, are sometimes likenesses of individuals.

Collected by James G. Swan, Dr. Franz Boas, and Lieutenant G. T. Emmons, U. S. N.

Carvings in Wood, Stone, and Shell.—Examples are shown consisting of receptacles connected with the preparation, serving, and storing of food, as dishes, platters, bowls, boxes, and chests, decorated with carving in the round or in low relief, the designs derived from the copious mythology of these tribes and worked out with great freedom and skill. Every object of common use was touched with artistic fancy, as the stone hammer, shell adze, and other tools of the exhibit show.

Collected by George Gibbs and James G. Swan.

Arts of the North Pacific Tribes.

Costume, Textile Work, and Wood Carving.—The costume of the North Pacific tribes was made of skin, woven bark, native wooden textiles, and traders' goods, ornamented with beaks of birds, hoofs, fur, and claws of animals, or buttons and beads secured from the white man. The ordinary costume consisted of a blanket or bark mat mantle, belt, breechcloth, leggins, and moccasins. The ceremonial costume was varied, but the parts usually consisted of headdress-mask, neck and breast ornaments, skirt with rattles and leggins, a rattle and staff held in the hand. Ceremonies were accompanied by songs, the beating of a drum, the sounding of rattles, and were held in a large wooden house, a model of which is shown.

Collected by J. G. Swan, W. H. Dall, and Lieut. G. T. Emmons, U. S. N.

Basketry.—Some of the finest basketry in North America is the product of the skill of the women of the North Pacific Coast of America, that which was made before the greater contact with the white people being the best and rarest. The specimens belong to the later period, but are interesting in design and execution. Two types are found; twined and coiled, the former being the common weaving; the forms are varied and the patterns are derived from natural objects.

Collected by Lt. G. T. Emmons, U. S. N., J. R. Swanton, and J. J. McLean.

Water Transportation.—The dugout canoe has its greatest development on the North Pacific Coast, where excellent trees grow near the shore and where the indentations of the coast and numerous islands induce a seafaring habit. The canoes are often large enough to carry a hundred persons, and in them long deep-water voyages are made. They have high prow and stem and are designed on lines adapting them both to the waters in which they are used and to the purposes to which they are put, whether for war, deep-water commerce, or for fishing. They were excavated by means of fire and the adze, and decorated with striking native colors, the designs being mythological.

Collected by Admiral Charles Wilkes, U. S. N., and J. G. Swan.

WESTERN ESKIMO.

Arts of the Western Eskimo, Southeastern Alaska.

Social Life.—The Eskimo inhabit the coast and a portion of the lower river valleys of Alaska, where, in spite of the rigorous climate, they have found means to adapt themselves to its requirements. The house is of logs covered with earth (model), in which they live during the winter; the costume is of

furs neatly cut, sewed, and trimmed (figure of man and woman); for the capture of game on which they subsist, they have spears, harpoons, bows and arrows, clubs; snowshoes and eyeshades for snow work; kayaks for water travel, and sledges for land travel with dogs. The mainstay of the household is the stone lamp, without which life would be unendurable in the Arctic, and they use dishes, dippers, scoops, water bottles, berry beaters, and mortars.

Collected by E. W. Nelson, J. W. Fisher, J. H. Turner, and others.

Arts of the Eskimo, Western Alaska and Greenland.

Water Transportation.—The models show the types of watercraft possessed by the Eskimo, and the material and mode of construction. The oomiak is a clumsy boat used by the women for traveling with the children and belongings of the family; the kayak is a graceful shell in which one man pursues game; the bidarka seats two men, and some models seat three or more. In the rivers, bark from trees takes the place of the skin covering used on boats by the coast Indians.

Collected by J. H. Turner, R. E. Peary, W. M. Noyes, P. H. Ray, Governor Feneker, E. A. Preble, and Dr. Franz Boas.

Arts of the Western Eskimo.

Wood Working.—With scanty materials and simple tools, the Eskimo produce finished works in wood that reflect great credit on their skill. They consist of dishes, trays, pails, dippers, ladles, and spoons, cut from solid wood or combining bending and excavating. The sides of vessels and pails are usually made of wood bent by steaming, and pinned with wooden or bone pegs. The decoration is with red ocher and soot and, compared with that of the Alaskan Indians, is very simple.

Collected by Dr. W. H. Dall, E. W. Nelson, I. C. Russell, and C. L. McKay.

Arts of the Western Eskimo, Southern Alaska and Bering Strait.

Basketry.—From the tough grass which grows on the coasts and southern islands, the Eskimo make strong and excellent baskets, wallets, mats, socks, and towels. The baskets from Attu are famous for their fineness and are sought by collectors. The common type of weaving is by twining, less frequently by coiling, in which case the Arctic willow is the material used.

Collected by L. M. Turner, Dr. W. H. Dall, and E. W. Nelson.

Arts of the Eskimo, Western Alaska.

Masks.—Like the Indians of southern Alaska and British Columbia, the Eskimo carve an infinite variety of masks which they use in ceremonies such as the "Return of the Sun." They are shaped from wood and adorned with feathers and paint. Sometimes they are large and elaborate, and sometimes made for wearing on the fingers.

Collected by E. W. Nelson, C. L. Hooper, and I. C. Russell.

HISTORICAL PAINTINGS OF ALASKA.

LENT BY J. T. RICHARDSON, ARTIST.

Sitka from the Islands, Showing Russian Castle, 1888.
Trading Post and Wharf Buildings, Sitka, Evening.
In the Old Quarter, Sitka, 1900.
The "Ranch" Native Village, Sitka, 1884.
Wolf Totem over Medicine-man's Grave, Wrangell.
Old Russian Trading Post, Sitka.
Lincoln Street, Sitka, 1887.
Russian Blockhouse, Alaska, 1900.
Buildings going to Ruin, Alaska, 1884.
The Old Warehouse, Sitka.
Blockhouse, Alaska, 1887.
Rear View of Greek Church, Sitka, 1888.
Former Governor's House, Sitka, 1905.
View of Wrangell, Alaska, in 1884.
The Three Crows Market, Sitka, 1889.

ALASKA.

Photographs by U. S. Fish Commission.

Old Klinkuan Village, Southeastern Alaska.
Klinkuan Indian Grave, Klinkuan Village, Southeastern Alaska.
Eskimo House made of Whale Bones and Driftwood. To the left a Rack with Drying Salmon. Karluk, Alaska.
Sodhouse and Storehouse of the Eskimo, Nakneek River, Alaska.
Group of Eskimo in Front of Storehouse, Nushagak Bay, Alaska.
Eskimo Winter Storehouse for Salmon, Fort Alexander, Nushagak Bay, Alaska.
Group of Point Hope Eskimo, Alaska.

HISTORY OF ALASKA.

Photographs by Lieut. G. T. Emmons, U. S. N.

Old Russian Graveyard, Sitka.
Russian Log Dwellings, Sitka.
Old Russian Log Building, Sitka.
Greek Cathedral of St. Michael's, Sitka.
Native Village in 1888, Sitka.
Con-dah-nah-ha, a Chilkaht Chief, Sitka.
Chilkat Indians Berry-gathering, Sitka.
Chilkat Graves and Kluckwan Village Houses, Southeastern Alaska.
Tlingit Indian Girls, Sitka.
Old Russian Saw Mill, Sitka.
Baranof Castle and Old Russian Buildings, Sitka.
Tlingit Canoe and Native Tlacin Bag, Sitka.
Old Russian Blockhouse, Sitka.
Old Russian Log Buildings, Sitka.
The Berry Dance, Sitka.
Tlingit Graves, Icy Straits.

PEOPLES OF THE PHILIPPINE ISLANDS.

The Negrito.

Family Group of the Negritos of Zambales, Luzon, Philippine Islands.—The Negritos are small, black, wooly-haired natives inhabiting out-of-the-way places in several islands of the Philippines, but mostly living in the great island of Luzon. They call themselves Aeta, and, because they are very shy, make their home in the mountain forests. Their houses are rude shelters scattered through the country and never gathered into villages like those of the Igorot. Not much has been known about them until the acquisition of the Philippines by the United States.

They cultivate a little, but depend for food principally on the fruits of the chase and forest products, a few of which they exchange with the lowland people for cloth, rice, or iron sufficient for their small needs. They are keen hunters of wild animals and their traps are quite ingenious.

Their only weapons are bows and arrows, and in the use and manufacture of them they are very skilful. Among them is found a primitive method of fire-making by sawing a knife of bamboo across another piece, as shown in the kneeling figures, the fire rising in the ground-off dust which falls beneath when the lower bamboo is cut through by the friction.

The Negritos are cheerful, intelligent, peaceable, and moral; they love music, and one of their chief amusements is dancing; they are born pantomimists, and, like children, dramatize the events they wish to relate. While physically the Negrito seems inferior, in reality he is strong, marvellously agile, and his black, wizened, dwarfish frame is capable of incredible endurance. Though nothing definite is known of his origin, the Negrito is thought to be a remnant of a once widespread population related to the Papuans, the Andamanese, and other black, wooly-haired peoples of Oceanica.

Designed by W. H. Holmes; Modeled by U. S. G. Dunbar.

Philippine Islander Weaving Cloth—Type of the Tagala People.—The woman here shown is a half-breed Malay and Chinese, such as constitute a large proportion of the population about Manila. She is engaged in weaving cloth on a hand loom, which is doubtless of foreign origin, although the type here represented has found its way all over the world and is practically the form to be seen throughout the United States in the first part of the last century and the colonial period for weaving homespun fabrics. The specimen here given is capable of making the plainest cloth, the sheds being made by means of the treadle worked by the feet. The shuttle and the heddle are worked by hand. Delicate fabrics are woven on these simple devices. In the Philippine Islands fiber of the finest quality abounds.

Costumes and materials collected by F. F. Hilder.

Arts of the Negritos of Luzon and Palawan, Philippine Islands—Objects Connected with Social Life.—The arts of the Negritos of Luzon are very limited and comprise the manufacture of bows, arrows, and quivers, snares for game, rude baskets, crude domestic utensils, and ornaments suitable to their simple life. The implement with which they make fire consists of two pieces of bamboo. Knives, bolos, and other necessaries they secure from the Filipinos in trade for beeswax brought out of the forest. The Negrito-like tribes of Palawan are more advanced than the blacks of Luzon, and the

majority of the specimens in the case are from the former island. They are musical instruments; personal ornaments, as combs, girdles, bracelets, leglets, and rings; domestic utensils of cocoanut and gourd, and traps for fish and other game.

Collected by J. M. Harkins, E. Y. Miller, E. L. Hawkes, and the American Museum of Natural History.

The Igorot.

Family Group of the Bontoc Igorot, Luzon, Philippine Islands.—The Igorot are of Malayan stock and live in the higher central portion of Luzon, principally in the Province of Bontoc. They cultivate rice in terraces on the hills, and also plant maize, bananas, sweet potatoes, and other crops; weave cloth; make pottery, and mine and smelt ore. Their houses are lightly constructed, and are gathered together into villages, ruled over by clan councils. The population of each group is, as a rule, at enmity with all others, and because the Igorot are the least modified of the Philippine tribes they were until recently addicted to the practice of head-hunting, which they held in common with many Malayan groups of the East Indies.

At the time of the War with Spain Igorot levies, equipped with armor, spears, bolos, and knives, were pushed forward by the Spanish to engage American troops, and it is said that they displayed much courage during the slaughter that followed.

The Igorot is of cheerful disposition, strong, a good worker, and inclined to peaceful pursuits. He is of medium stature, has fine muscular development, black eyes and hair, smooth skin, and differs little from the Dyak of Borneo, to whom he is related. Occasionally there is seen among the Igorot traces of an admixture with the Negrito, whom they supplanted, and on the borders of their habitat they merge into other uncivilized tribes.

Designed by W. H. Holmes; Modeled by U. S. G. Dunbar.

Arts of the Igorot of Luzon, Philippine Islands—Objects Connected with Social Life.—The Igorot live in the mountains of Luzon, and grade in culture between the Negrito and the civilized tribes. The case contains a model of their house and granary; forks, spoons, bowls, cups, dishes of dark hardwood, with ceremonial handles; baskets for carrying ore and for storing food; a fire piston for lighting the fire; pipes of carved wood; spears, head-hunting ax, knives, shields, and spear for hunting boars; traps and nooses for capturing game; a scarecrow, carrying baskets, and a shovel used in agricultural work; jewsharp, gong, flute, and articles of personal ornament, and carved wooden figures which are probably connected with the primitive religion of this tribe.

Collected by the Philippine Insular Commission and Col. E. A. Mearns, U. S. A.

The Moro.

Arts of the Moro and Bagobo Tribes of Mindanao, Philippine Islands—Objects Connected with Social Life.—The arts of these tribes are little modified by European influences, but the Moro have received much from the civilized peoples of the Asiatic mainland, especially in decorative art and metal-working. There are shown in the case baskets and vessels made of

bamboo and rattan, torches of palm and resin, carved wood shields, shell-work ornaments, carabao-skin armor, and objects made of horn, all of vegetal and animal substances. Brasswork of the Moros, consisting of bracelets and armlets, betel and lime boxes inlaid with copper and silver, pitcher, tea-pot, vase, covered bowl, snuffbox, gongs, and cooking bowls, show the extent to which this material has taken the place of utensils of gourd, cocoanut, and bamboo. Ironwork consisting of daggers, knives, swords, lances, and harpoons, manufactured with great skill and taste, show that this metal is utilized solely for weapons. The Bagobo specimens consist of personal ornaments, baskets, haversacks, belts, bags, and pouches, and are ornamented with beads of various colors and other gewgaws.

Collected by Col. E. A. Mearns, U. S. A., J. M. Harkins, F. F. Hilder, A. H. Stewart, and the Philippine Insular Commission to St. Louis Exposition.

Arts of the Philippines—Costume of the Tribes of Mindanao.—The Moro tribes of Mindanao, in keeping with the customs of the Mohammedans, clothe themselves, but wear no foot-covering. Their costume consists for the men of a short jacket, trousers of formal cut, a sash, a cap, and, in some cases, a turban; and for the women the Malay skirt, or sarong, which reaches to the knee. The Moro affects bright colors, and is fastidious as to the quality of the cloth and the cut of his garments. The costume of the Bagobos and other related tribes of Mindanao consists of a short jacket of mixed cloth of native weaving, worn by the men, and a short skirt of the same material, worn by the women. As is customary among all of the uncivilized tribes of the Philippines, the men wear a loin cloth and a native print head kerchief, which, when figured in a certain pattern, denotes that its wearer has taken the head of an enemy.

Collected by Col. E. A. Mearns, U. S. A., A. H. Stewart, J. R. Harris, and F. F. Hilder.

Arts of the Moro, Mindanao, Philippine Islands—Tools and Utensils.—The case contains tools of iron for timbering, splitting bamboo, agricultural purposes, and general work; baskets of various forms and materials, skilfully woven and applied to numerous uses; traps and snares for capturing wild chickens and other game, and traps for catching fish; a fire-making piston, and a torch of resin. The arts of the Moro have been influenced largely by the tropical vegetal environment in which they live, and which has supplied by far the greatest portion of the materials that minister to their needs. Without iron and other metals the resources of their islands would be sufficient to satisfy the demands of a semi-civilization like that of the Moros, and there are evidences that useful metals have not long been known to them.

Collected by J. R. Harris, Col. E. A. Mearns, U. S. A., J. M. Harkins, and the Philippine Insular Commission to St. Louis.

Arts of the Moro, Mindanao, Philippine Islands—Tools and Utensils.—The case contains tools and appliances used by the Moros in their customary occupations. In form and materials these tools bear a resemblance to those found widely in Malaysia, where commerce and migration have distributed them. They consist of basketry in great variety, made of bamboo, rattan, and bejuco; traps ingeniously devised for the capture of small game; knives for domestic purposes, for work in the woods and fields, and for offensive and defensive warfare; the most useful ax, which may, when desired, be converted

into an adze; agricultural tools, and other specimens illustrating weaving, wood-carving, metal working, and the manufacture of musical instruments.

Collected by Col. E. A. Mearns, U. S. A., J. M. Harkins, J. W. Wood, Gen. J. M. Bell, U. S. A., and others.

Arts of the Moros of Mindanao, Philippine Islands—Metal Work.—The Moros are in advance of all other Philippine tribes in their metal work, and in the application of decorative designs on objects connected with their daily life. The metal work consists of betel-boxes, lime-cups, trays, bowls, vases, and other appliances connected with the use of the narcotic betel. Weapons are illustrated by armor for the trunk, shields of carved wood, and cutting weapons, such as the borong and the waved kris. The esthetic side of their life is illustrated in full by the decorative designs or forms and by musical instruments, consisting of drum, series of brass gongs mounted on frame of carved wood, and the large bass gong, which is a remarkable specimen of casting. It is believed that the larger gongs are secured by the Moros from the Asiatic mainland.

Collected by Major G. P. Ahern, U. S. A., J. R. Harris, and the Philippine Insular Commission to St. Louis.

The Tagals and Other Christian Tribes.

Arts of the Philippines.

Edged Weapons of Iron.—The weapons of the islands are remarkable for their variety, the skill displayed in their manufacture, and their use as insignia. The bolo, a weapon with broad lanceolate blade and short, curved handle, is most widespread and has many varieties, some of them much modified by European influence. The Kris, with waved or straight blade, widening to a spur at the base, is a Moro weapon; the Kampilan, with long, straight blade widening to a truncated end is also Moro, as is the Talibong or headsman's sword, with a long, curved blade mounted in a handle. Daggers and knives shown in the case follow the forms of the weapons mentioned. The lances, confined mainly to the southern islands inhabited by the Moros and like tribes, are fine specimens of metal-work. The shields vary from the pronged (Igorot), the long and broad (Dyak-like tribes of Mindanao), to the circular shields of the Moro, and they are made with much taste and skill. Sword canes, a folding knife-sword, and knives are also shown.

Collected by President Roosevelt, Dr. R. B. Grubbs, Col. E. A. Mearns, U. S. A., J. M. Harkins, Gen. J. M. Bell, U. S. A., and others.

Head Coverings.—The large hats of the Philippine tribes are characteristic of tropical countries where the excessive light renders such head-covering necessary. In no other feature of costume is there such a variety of style, indicating locality, tribe and rank, and occupation of the wearer. While the hats of the Christianized tribes are modifications of the helmet type, those of other tribes are of Malay types, brought in through the waves of migration. The Igorot hat is merely ornamental, and the Negritos and some wild tribes whose habitat is forested wear no head covering, while other tribes wear the head-band or handkerchief. The most skilful workmanship is lavished on hat-making, and some of the specimens are worthy of great admiration.

Collected by F. F. Hilder, Major G. P. Ahern, U. S. A., J. W. Wood, and the Philippine Commission to St. Louis.

NEEDLEWORK.—The ornamentation of woven cloth with designs in needlework is general among the advanced tribes of the Philippines. Floral and other elaborate designs in accordance with European taste are generally employed by the Christianized peoples, who also weave the most delicate fabrics of pina and silk thread and make exquisite drawn work. The Moro designs are conventional and show Mohammedan influence. They are embroidered in brilliant silks, and frequently sentences from the Koran form the decorative patterns.

Collected by F. F. Hilder and A. J. Gies.

OBJECTS CONNECTED WITH SOCIAL LIFE.—The Tagals have been in contact with the Spanish civilization for several centuries and have made progress in the arts of life, so that they are now not inferior to any other Philippine peoples in culture. Their houses are suited to the tropics, and the models shown give an impression of their materials and appearance. Pottery of unglazed terra cotta, ornamented with incisions, is made and used extensively for stoves, cooking pots of various sizes with lids, dishes, water bottles, and saucers. The shell of the cocoanut is much used for cups, bowls, dippers, and spoons. Bamboo enters into their arts for a myriad purposes, especially in furniture, vessels, and house-building. The domestic utensils are represented by articles used in the laundry and about the native hearth—tubs, bowls, clothespins, fire-blower, broom, lamp, wooden and earthenware dishes, and milk and palm wine vessels.

Collected by General James M. Bell, U. S. A., and F. F. Hilder.

TOOLS AND UTENSILS.—The Tagals are the progressive inhabitants of Luzon and occupy the coasts and fertile interior lands. As fishermen they use the traps of various models, lines, baskets, floating creels, nets, and dredges like those shown in the case. As agriculturists they have reapers for heading rice, knives for cutting grass, bolos for chopping, shredders for removing the husk of the cocoanut, digging-sticks for potatoes, traps for rats and other noxious animals, carrying, winnowing, and storage baskets. Boxes, bottles, bird cages, strainers, and numerous other useful and ornamental forms are the products of the skilful worker in basketry materials.

Collected by F. F. Hilder.

WEAVING.—A surprising variety of textile work is produced on the hand looms of the Tagals, and the quality is remarkable for its fineness, while much taste is displayed in its ornamentation. The abaca, or "Manila hemp" fiber, lends itself to the manufacture of silky textures, as well as to coarse cloth and cordage. The finer grades are called sinamay. Cotton is woven as plain cloth or in striking patterns. Pina fiber produces the finest stuffs, which are strong and diaphanous, and costly both to the weaver and purchaser. When silk is combined with pina as pattern or warp the fabric is called jusi—a beautiful transparent textile, much used for skirts, jackets, and shoulder kerchiefs by the Tagal women.

Collected by F. F. Hilder.

LAND TRANSPORTATION.—Transportation by land in Luzon was formerly over trails by means of bearers. The caribao or water buffalo is the only native draught animal, and the vehicles are rude sleds and clumsy two-wheel carts, the latter usually covered to protect the load from sun and rain. The wheel vehicles bear a general family resemblance to those in use in India and

other portions of the East, and were, no doubt, introduced from the Asiatic mainland.

Collected by F. F. Hilder.

WATER TRANSPORTATION.—In contrast with land transportation, water transportation is quite varied and well organized in the Philippines. Beginning with the dugout canoe of the fisherman, there is a series in which the simple keel is modified by the addition of decks, superstructure, masts, and rigging. Carrying out the idea of the fisherman's outrigger, the freight boat shows two keels side by side, covered with a single deckhouse with expansible roof. Freight barges, called casco, are often very large. Passenger boats for coasting are modeled after the Malay pirate vessels, and in some cases the Chinese type of junk is used.

Collected by F. F. Hilder.

PHOTOGRAPHS BY THE UNITED STATES SIGNAL CORPS. PERMISSION OF CHIEF SIGNAL OFFICER, U. S. A.

Light-house, Corregidor Island, Entrance to Manila Bay.
Fort Malate, Manila, after American Bombardment of August 13, 1898.
Congressional Hall of Filipino Republic.
Block-house, Malabang, Mindanao.
Map of American Operations against Town of Manila, August 13, 1898.
Block-house, Iloilo.
Magellan's Praying Place.
City Wall, Manila.
Governor's Palace, Manila.
Entrance Gate to Fort Santiago, Manila.
Residence of Peace Commission, Manila.
Residence of Captain General, Manila.
Office of Captain of the Port, Manila.
Convent Wall, Calapan, Mindoro.
Block-house, Manila.
Spanish Fort, Cebu.
Spanish Fortifications, Manila.
Church Interior during Services, Cagayan.
Convent and Church, Ormoc.
Spanish Fortifications on the Luneta, Manila.
Residence of Aguinaldo, Cavite Viejo.
Old Spanish Barracks, Pasacao.
Governor General's Residence, Manila.
Spanish Fortifications, Manila Bay.
Municipal Building, Manila.
Manila Bay.
View from Fort William McKinley.
William H. Taft delivering his Inaugural Address as First Civil Governor of the Philippines, Manila, July 4, 1901.
Light-house, Pasig River Entrance.
The Luneta and Walled City, Manila

PHOTOGRAPHS.

Series of photographs in two screen cases illustrating the scenery, architecture, natives, family life, occupations, and historical events in the Philippines at the close of the War with Spain.

Gateway "Puerta de Isabel," Walled City, Manila.
Gate to the Arsenal.
Market in Tondo, a Suburb of Manila.
Native Landing-craft.
La Luneta Park, Manila.
Native Landing-craft.
Building Cascos.
An Execution on the Luneta.
Pasig River at the Custom House, Manila.
Mending a Casco, Caulking with Lime, Oil, and Cocoanut Fiber.
Tondo Canal, near Caloocan, Manila Province.
A Canal entering Manila.
Monument to Magellan, Discoverer of the Philippine Islands.
Captain Salbador, Insurgent Leader.
Group of Tinguianes from Abra, Benguet District, Luzon Island.
Spanish Mestizo, or Half-breed Tagal.
Three Tinguiane Warriors.
Group of Thirteen Moros, Zamboanga, Capital of Mindanao Island.
A Native Igorot from Ilocos Sur, Mountains of South Ilocos Province, Luzon Island.
Church of St. Augustine, Manila.
Chapel, de La Loma Cemetery.
San Sebastian Church, Manila.
General Luna, Insurgent Leader.
Emilio Aguinaldo, Commander-in-chief of the Tagal Insurgent Forces.
Gregoria del Pilar, an Officer of the Tagal Insurgent Forces.
General Concepcion, Insurgent Leader.
Insurgent Government Officials.
General Isidor Torres, Insurgent Leader.
Colonel Cardenas, Insurgent Leader.
Secretario de Cardenas, Insurgent Leader.
General Garcia, Insurgent Leader.
Insurgent Leader Emilio Aguinaldo and Troops at Malolos, Bulacan Province, Luzon Island.
Insurgent Leader Emilio Aguinaldo and his "Congress."
Two Negrito Warriors, Mariveles, Bataan Province, Luzon Island.
An Execution on the Luneta.
Two Igorot Warriors of Bontoc District, Luzon Island.
Filipinos with Gun captured from Yorktown's Boat.
Church and Insurgent Headquarters, San Fernando, Union Province, Luzon Island.
Lieutenant Greene in an Insurgent Village.
U. S. Soldiers' Graves in Paco Cemetery, Manila.
Funeral of General Lawton.

FAMILY GROUPS OF THE NEGRITOS

Rojas and Companions before Execution on the Luneta.
Bodyguard of Insurgent General Panar.
U. S. Government Hospital, built of Nipa Palm.
Rojas and Companions after Execution.
Insurgent Congress Hall, Malolos, Bulacan Province, Luzon Island. Aguinaldo in the Chair on the Platform.
U. S. Government Corral.
Two Moro Chieftains, Sulu Archipelago.
Petty King of the Tinguianes, with his Guards, Abra, Benguet District, Luzon Island.
Group of Tinguianes Men and Women.
Group of Negritos.
Igorot Soldier of Bontoc District, Luzon Island.
Group of Eleven Mariveles Warriors.
Five Moro Chieftains, Zamboanga, Capital of Mindanao.
Three Moro Chieftains, Sulu Archipelago.
Gorge near Sitang, Cavite Province, Luzon Island.
Plowing in Antipolo, Morong District, Luzon Island.
View of Zamboanga, Mindanao Island, from the Sea.
Plowing with a Bullock on a Mountain, Batangas Province, Luzon Island.
Street in San Miguel, Bulacan Province, Luzon Island.
Lagoon, Pagsan River.
Bancos, Round-bottom Boat, with Outriggers.
Bridge of Spain, Manila.
Ayala Bridge, over the Pasig, San Miguel and Paco.
Railway Bridge, ruined by Insurgents.
Suspension Bridge, from Site of the New Government Ice Plant.
San Mateo Valley, Manila Province, Luzon Island.
Casco unloading Nipa Palm Fiber for thatching Houses.
Bridge of Spain, Manila.
Suspension Bridge, Manila.
Mouth of the Pasig River, from Fort Santiago, Manila.
Bancos, Round-bottom Boats, with Outriggers.
East End of Corregidor Island, Manila Bay.
San Pedro Macati, Manila Province, Intrenchments in the Foreground.
Group of Insurgent Cannon.
An Execution on the Luneta.
Igorot Warriors.
Petty King of the Tinguianes, with his Guards, Abra, Benguet District, Luzon Island.
Group of Beggers.
Waterworks near Manila.
Calle Iris (Iris Street), Manila.
Street Scene, San Miguel, Island of Leyte.
Calle Nozalida (Nozalida Street), near Ermita, a Suburb of Manila.
Calle Alix (Alix Street), Sampaloc, a Suburb of Manila.
Steam Engine at Malabon, Luzon Island.
Native Dwelling at Sampaloc, Suburbs of Manila.
Native Dwelling in Sampaloc, Suburbs of Manila.
Native Dwelling at San Fernando, Luzon Island.
Santa Mesa Road.

Iloilo, Panay Island.
San Pedrillo, Paco, Suburbs of Manila.
Three Tinguianes from Abra, Luzon Island.
Calle Escolta (Escolta Street), Manila.
Monument to Carlos III.
Spanish Mestizo, with two Boys.
Shipping in the Pasig River at Manila.
Along the Road to Pasig, near Manila.
A Native Woman and her two Sons.
Native Cock-fighting.
Three People at a Native Bath and Well.
Natives carrying Produce to Manila.
Natives carrying Produce to Manila.
Carrying a Pig to Market.
Market at Dagupan, Pangasinan Province, Luzon Island.
Casco, or Flat-bottom Freight Boat.
Bancas, Round-bottom Boats with Outriggers.
Foreign Shipping in the Pasig River.
Foreign Shipping in the Pasig River.
Coasting Banca, or Round-bottom Boat with Outriggers.
Washerwomen on the Pasig River.
Dugouts in the Canal at Manila.
Bank of the Pasig River outside of Manila.
Façade of a Building in Manila.
Royal Philippine Exposition (Interior).
Suspension Bridge, Manila.
Ayala Bridge, Manila.
Panoramic View of the Pasig River at Manila.
Shore at Navotas, Manila Province.
Church at Sampaloc, a Suburb of Manila.
Cathedral of Manila.
Church at Calumpit, Bulacan Province, Luzon Island.
Church of San Sebastian, Manila.
Native Fisherman of Tondo, a Suburb of Manila.
Church of Santo Domingo, Manila.
Church of Tondo, Manila.
Malabon Church from the Bridge.
Santa Anna Church, Captured by Americans.
Church at San Pedro Macati, Manila Province, Luzon Island.
Dr. Rizal.
Plaza de Ayuntamiento (Civil Court Square).
Cathedral of Manila.
Execution of Dr. Rizal, Rebel against the Spanish Government.
Tagal Woman Milk Vendor.
Street in the Walled City, Manila.
Santa Anna Church, Captured by Americans.
Church in Santa Cruz, a Suburb of Manila.
Native Fisherman of Tondo, a Suburb of Manila.
Mangrove Swamp at Malabon, Manila Province, Luzon Island.
Mangrove Swamp at Malabon, Manila Province, Luzon Island.
Farm near Manila.

Farm near Manila.
House in San Juan del Monte, Manila Province, Luzon Island.
Plowing in Antipolo, Morong District, Luzon Island.
A Country Store near Manila.
Two Carabaos, or Water Buffalos, with Drivers.
Uliuli Road.
Along the Road to Pasig, near Manila.
Nipa Palm Grove, Batangas Province, Luzon Island.
A Carabao Farm.
Natives Drying Carabao Meat.
Natives Drying Carabao Hides.
Coasting Banca, or Round-bottom Boat with Outriggers.
Natives selling Milk in Bamboo Vessels.
Canal Scene, Pandacan, Manila Province.
Natives Casting Circular Fishnet.
Harrowing a Field with the Carabao, or Water Buffalo.
Tondo Canal, Suburbs of Manila.
Natives using Scoop-net in Shallow Water.
Group of Rich Natives from Batangas Province, Luzon Island.
Boys Matching Pennies.
A Small Cart.
Arsenal at Cavite, south of Manila.
Bridge over the Malabon River, Luzon Island.
View of Tondo, a Suburb of Manila: Raft of Bamboo.
Street in Albay, Capital of Albay Province, Luzon Island.
Plaza Amboaque, Manila.
Entrance to the Cemetery de La Loma, Manila.
Spanish Mestizo Woman in Holiday Dress.
Group of Tagal Children.
Group of Natives from Lingayen, Pangasinan Province, Luzon Island.
Chinese Mestizo Family.
Tagal Family Bathing.
Tagal Family of Nine Children.
Washerwoman on the Pasig River.
Group of Natives from Dagupan, Pangasinan Province, Luzon Island.
Group of Moro Women, Mindanao Island.
Tagal Women.
House Building at Imus, Cavite Province, Luzon Island (Frame).
House Building at Imus, Cavite Province, Luzon Island.
Philippine "Boy" (Servant).
Boy Riding a Carabao.
House Building at Imus, Cavite Province, Luzon Island (Frame, Covered).
House Building at Imus, Cavite Province, Luzon Island.
Native Fisherman of Tondo, a Suburb of Manila.
Typical Native House.
A Bamboo Sled.
Stacking Rice at Meycanayan, Bulacan Province, Luzon Island.
Bank of the Pasig River outside Manila.
Transplanting the "Sacate" Plant.
Garden of the Jesuit College, Manila.
Market at Dagupan, Pangasinan Province, Luzon Island.

Church in Santa Cruz, a Suburb of Manila.
Native Pony and Cart.
East End of Corregidor Island, Manila Bay.
A Colesen (Dog Cart).
Petty King of the Tinguianes with his Guards, Abra, Benguet District, Luzon Island.
An Execution.
A Native Plow.
Monument to Simon de Anda, Spanish Patriot.
Group of Women and Children.
Market at Banan, Batangas Province, Luzon Island.
Natives Sawing Lumber from Logs by Hand.
Spanish Mestizo Woman in Holiday Dress.
Spanish Guns mounted on the Sea Wall at Manila.
Washerwomen on the Pagsan River.
Ruins of a Native Pottery Kiln.
Canal Landing, Pasig River.
Pounding and Sifting Rice.
Insurgent Government Banquet Hall, Malolos, Bulacan Province, Luzon Island.
Natives using Scoop-net in Shallow Water.
Harrowing a Field with the Carabao, or Water Buffalo.
Three Tagal Women Sewing.
Tagal Soldier with Bow Gun.
Bay Shore at Tondo, a Suburb of Manila.
Fishing Rafts at Malabon, Manila Province.
A Native Family preparing Food.
General Garcia and Troops at Caloocan, Luzon.
Natives Dancing.
Spanish Mestizo Flower-girl.
Cigarette-making, Manila.
Tagal Woman, Manila.
Tagal Woman, Manila.
Tagal Mother carrying a Child.
Spanish Mestizo Woman in Holiday Dress.
Tagal Family: Mother and Children.
Tagal Woman.
Hotel de Oriente, Manila.
Tagal Woman, Manila.

PEOPLES OF THE HAWAIIAN ISLANDS.

Model of Village.

Village Group of the Early Hawaiians.—Formerly the Hawaiians lived in grass thatch houses of several kinds grouped into villages, which were the home of a clan ruled over by a chief and a priest. The houses shown in the model, which is a restoration of Hawaiian social life before contact with Europeans, are, beginning from the left—the *mua,* eating house for the young men; the *lanai,* or bower, often attached to the house; the *alii,* or chief's house; the *noa,* or house of the chief's wife; the *aina,* where the women eat,

and the *pea,* or tabu house of the women. On the front row is the *heiau,* or temple, with image and skulls on posts; the *kua,* or workshop, with *lanai,* or shed, and on the extreme right, a *pupupu,* or fisherman's temporary shed, back of which a laborer is cultivating taro in artificially irrigated ponds. On the shore are natives bathing, a canoe being unloaded, and a fisherman hauling his net in a fish pond. In the open space in front of the village is an oven from which a roast pig is being taken; two men hauling a log; a man making wooden *umekes,* or bowls; two women pounding *taro* root to make *poi;* a woman beating bark to make *tapa* cloth; a woman painting *tapa* cloth; a group of women feasting, and a woman bearing *leis* or wreaths of flowers; a nurse with children; the chief's wife and son; the chief standing on a platform in front of his house, and the chief's *poi,* or food-bearer, with calabashes. "Such," as Malo finishes his quaint chronicle, "were the possessions of the old-time people who lived on the ancient Hawaii. Great pity for them." (Legend on frame of model.)

Designed and modeled by I. B. Millner.

SERIES OF PHOTOGRAPHS.

By H. W. Henshaw.

Native Grass Hut under Cocoanut and Mango Trees, Hawaii.
Native Canoes: Cocoanut and Lauhalla Trees, Puna District, Hawaii.
Canoe, fitted with Outrigger, Waiakea River, Hilo, Hawaii.
Girl with Leis around her Neck, Hawaii.
Kanaka Fisherman and Dugout Canoe, Hawaii.
Method of carrying Burdens, Hawaii.
Kanaka just in from Fishing, Hilo, Hawaii.
Grass House, shaded by Papaia Trees, Puna District, Hawaii.
Kanaka spearing Fish, Hilo Bay, Hawaii.
Making Fire with Two Sticks by Friction, Hawaii.
Kanaka pounding Poi: Patch of Taro in Background. Hawaii.
Kanaka pounding Poi, Hawaii.
Kanaka Women gathering Limpets for Food, Hawaii.
Hula Girl dressed for the Dance: Man playing the Nose Flute. Hawaii.
Kanaka spearing Fish, Hilo, Hawaii.
Grass Hut: Wild Tobacco and Taro in the Foreground. Hilo District, Hawaii.
Native Grass Hut: Natives in Foreground pounding Poi. Puna District, Hawaii.
Kanaka with Raincoat of Lauhalla Leaves, Hawaii.
Kanaka about to throw Cast Net, Hawaii.

By U. S. Fish Commission.

Grass House of the Kanakas, Hawaiian Islands.
Grass Houses of the Kanakas, Hawaiian Islands.

EMERSON ETHNOLOGICAL COLLECTION.

Fish-hooks.

1. *Makau hulu-lua* of whale tooth; has two barbs; finely finished; provided with line attached—*ka-a*—also with small line—*mali*—to retain bait. Length, about 4½ in.

2. *Makau hulu-kahi* of whale tooth; has but one barb. Is let down into the water or used as a trolling hook, without bait. Provided with *ka-a* attached line; also *mali* (the line) to hold the bait.

3. *Makau hulu-kahi.*—Fish-hook with one barb; whale tooth; figure highly incurved; has the *ka-a* attached; also the *mali.* The latter is the line to hold the bait in place. Extreme length, 2⅝ in.

4. *Makau lihi,* has no barb; whale tooth; has the *ka-a* and the *mali.* Fish are sometimes attracted by spitting into the water bait chewed up. Length, 2¼ in.

5. *Makau hulu* (*hulu* means barb).—Hawaiian; of tortoise shell; considered very choice by the Hawaiians; has no *ka-a;* used largely in shallow waters. Length, 1¾ in.

6. *Makau lihi,* or *makau lihi honua,* so called because its barb was so situated low down. It was also called *m. paca* (lucky), because the material was human bone, a lucky material. This is an heirloom from Kona, Hawaii. No line attached. Length, 1⅛ in.

7. *Makau opelu,* or *m. pa,* from the material, mother-of-pearl, or *makau lou.* Mostly used to catch the *opolu,* a fish similar to the herring. Has line attached; *i. e., ka-a.* Length, ⅝ in.

8. *Makau mahina* (*mahina,* the moon); of iron; called also *lihi mahina.* Has line attached. The Hawaiians had the custom of soaking their fish-nets and lines in a tanbark, thinking it preserved them. Has no barb; the great curve of the hook was thought to compensate for this lack; line attached. Length, 3½ in.

9. *Makau oopu-hue,* iron; has no barb; line attached; also the *mali.* This hook has a peculiar curve. Length, 2½ in.

10. *Makau oopu-hue,* or *m. kikala-ke'e* (*humpback*); has line attached. The material is iron.

11. *Makau hoomo;* so called because it is intended to be swallowed whole. Has line attached; material of iron. None of the hooks of Hawaiian make have a barb, and the same is true of those made of brass. Length, 1½ in.

12. *Makau hoomo,* or *m. kikala-ke'e.*—Is provided with the *ka-a* and the *mali.* Sometimes this hook is bundled up together with a mass of fine bait and then thrown into the water, when the bundle opens by a skilful arrangement of the *mali.* Length, 1⅞ in.

13. *Makau copu-hue,* or *m. kikala-ko'o,* or *m. kuli-pa'a* (the Hawaiians oftimes gave fanciful names to their fish-hooks). Material, iron; has line attached, and *mali.* Length, 2½ in.

14. *Makau lou,* or *m. oopu-hue;* of iron; line attached. Length, 2⅛ in.

Trolling hook.

19. *Pa-hi-aku* (*pa,* mother-of-pearl).—The plate is of mother-of-pearl, the barb of whale tooth, the line and lashings of *olona,* a bark much used in making lines and nets. The brush is of pig bristles. It was trolled with a comparatively short line at the end of a short rod. The *aku* was the bonito. Notice the resemblance of this to the trolling hooks of the Micronesian group. (See No. 26.) Length of plate, about 3 in. and 2½ in.

Squid hooks.

45. *Leho-lu-he'e.*—A large cowrey, with a stone carved into the shape of a cowrey, are lashed to a staff. To the lower end of the staff are fixed two hooks, which may be of bone, of wood, or of iron. A brush is attached below. The Hawaiians claim that the stone and the cowrey must have a certain

color resemblance to each other in order to attract the squid. Lead is now at times used instead of stone. This is let down into the water and dangled close to the octopus, who is attracted by it and wraps himself about it. This method is still very successfully practiced by Hawaiian and by Chinese fishermen. It shows no signs of going out of date. The wood here used is the *kauila,* once the favorite material for spear-making.

46. *Leho-lu-he'e.*—For description, see No. 45. In this the fisherman employs hooks made of brass. The stone used as a sinker in this contains many crystals of olivine. The stone is called *komina paakai.*

272. *Pauhu-lu-he'e.*—In this specimen two cowries are used, with but one stone sinker; otherwise the arrangement is the same as previously mentioned. The Hawaiians apply to this arrangement a new name as above.

Eel-catchers.

22. *Haca-puhi.*—A double-cylindrical stick—*kauila*—is used, with a line attached to its middle. The bait is wrapped about one end of the stick and held by means of the smaller line. The other sharp end of the stick is thrust into a split end of another long stick, which constitutes the handle. By this means it is thrust into the hole or habitat of the eel. When swallowed by the eel, and when the line is pulled, the stick turns crosswise and cannot be regurgitated by the eel.

47. *Haoa-puhi.*—In this case the fisherman has provided a little hole in the *paca* to receive a thread-like line for the purpose of holding the large line down to its place while the hook—though it can hardly be called such—is being swallowed by the eel. The material is of bone. An arm of the quid is a favorite bait for this kind of fishing, being wrapped about the forward end of the *haoa.*

Fish-hooks from Micronesia.

It will be interesting to compare with the trolling hooks of the Hawaiians the *pa-hi-aku*—those from the Micronesian groups of islands—with which they have points in common: the mother-of-pearl plate and the hook of bone or of mother-of-pearl attached thereto.

26, 27, 29, 31, 32, 33, 35. The material of each one of the specimens here shown is substantially the same and the method of construction the same, there being used a plate of mother-of-pearl, to which is attached very firmly a hook of the same material. The hook has a hole near its base to give the lashing a better hold. A hole is also bored in the upper end of the plate for the attachment of the line. The lashings are evidently from the bark of the *hau,* as it is called in Hawaii (a sort of hibiscus). A fringe is attached to act, no doubt, as a means of steadying the hook in its course. (The Hawaiian hooks [19-21] are more delicate and adapted to fishes with a smaller mouth; they also have more elaborate lashings.) These Micronesian hooks are of wide-spread use, being found in all parts of that archipelago.

Fish-hooks from the small Island of Banope.

23. Banope, or Panavi, is a small island of the Santa Cruz group and is situated 10° 17′ S, and in long. 166° 19′ E. (W. T. Brigham: "Index the Islands of the Pacific.") This hook is the product of the ingenuity of the natives of this island. The shank is a crystalline limestone, which is said to be made from a stalactite that occurs in caves located on this island. The hook is of iron, the brush is evidently of human hair. It is, without doubt, used as a trolling hook.

24. The shank of this hook is of the same material as No. 23, but the hook is of bone, and the brush of hibiscus bark.

Fish-hook from Micronesia.

40. This hook, obtained from Captain Garland of the missionary ship *Morning Star,* was intended for a shark-hook. It is rudely but effectively constructed by what seems to be the bent root of the mangrove. The two parts are lashed together very securely.

Fish-hook from Alaska.

49. The shank is a straight piece of pine carved rudely to represent the human figure; to this is lashed at an angle of about 30° another piece, which holds the iron barb. It is noticeable that the barb in this, as in our own hooks, points inwardly, whereas the Hawaiians place the barb by preference externally, when there is but one.

Net-making Utensils—Hawaiian.

50. *Bobbin* to hold twine in net-making, called by the Hawaiians *Hi'a upena.* The material is evidently whale tooth.

51. *Bobbin-Hi'a upena.* Bone.

52. *Bobbin.*—Mahogany-colored wood of the kauila, much used by the Hawaiians for spears.

53. *Gauge* to measure the size of the mesh. A simple plate of tortoise shell.

54. *Gauge* used in measuring the size of the mesh of a fish-net.

Bowling Stones.

64. *Ulu-maika.*—Such was the name given the stones of which this is a specimen. The ulu-maika, a biconvex disc, was bowled along a prepared track. The winner was sometimes the one who drove his disc farthest, or who succeeded in passing his disc between two sticks that were set up, as wickets. The game was popular and accompanied with betting. This specimen, a dark basalt of a pinkish hue, is a little below the average in size. This stone bears the mark of having been used as a hammer.

65. Gray sandstone; small size.

66. Gray sandstone; the size of this is so small that one is almost inclined to query whether it might not have been used or intended for some other purpose than the game of ulu-maika, say for the game of kuhola.

67. Dark, heavy bazalt; of small size, 2¾ in.

68. Dark bazalt with veins of dark-reddish color; diameter, 2½ in.

69. Gray sandstone; diameter, 2 9/16 in.

70. Gray volcanic stone; diameter, 3¾ in.

71. Gray sandstone. This specimen is decidedly fuller on one side, or surface rather, than on the other, indicating that it was probably intended to run in a semi-circular course. This is a supposition in accordance with fact, for it is well known that the Hawaiians had ulu-maika courses that were purposely laid out with a bend to them, and that they had bowling stones fitted by their one-sidedness to follow such a course; diameter, 2⅞ in.

72. This stone has all the marks of being an ulu-maika, yet it may have been used as a kuhela stone. (See No. 148.) Diameter, 2 7/16 in.

55. Gray sandstone; diameter, 3 15/16 in.

56. Gray sandstone; diameter, 2⅜ in.

57. Gray sandstone; diameter, 2⅜ in.

58. A fine dark heavy basalt, the same material as that of which the adzes are made; diameter, 3 5/16 in.

59. Volcanic sinter, a light yellow limestone mixed with dark red nodules and patches of a mahogany color; called by the Hawaiians *ili-wela* (sunburnt skin). This stone was obtained from a man afflicted with a chronic disease, for which he had long cherished this stone as a remedy. His talisman had failed him. Diameter, 3⅜ in.

60. Same material as 59. A much battered specimen; diameter, 3¾ in.

61. Material: a cream-colored limestone, called by the Hawaiians *luwalu;* it must be borne in mind that these stones were ofttimes used for some other than their original purpose, and even came to flatten the lashings of a canoe; diameter, 3⅛ in.

62. A very solid, business-like stone, capable of withstanding much knocking about. A dense and heavy stone; has evidently been used as a hammer; diameter, 3 in.

63. Crystalline, almost like granite; contains olivine; has evidently been used as a hammer; diameter 3 9/16 in.

96. A light gray sandstone; diameter, 3 in.

101. Heavy granular basalt; from its decided one-sidedness it must have been designed to travel in a circular course. Has been used as a hammer. This specimen must have been originally the lower part of a poi pounder; diameter 4¼ in.

Spherical Bowling Stones—Ulu.

98. The *ulu* is rudely spherical in shape, and is so named because it resembles in figure the bread-fruit, which is called *ulu.* The use of this stone in bowling antedated that of the *maika,* or *ulu-maika.* Before the stone *ulu* was invented for use in the game of bowling, the hard unripe bread-fruit itself was used as the instrument of the game, and its name became transferred to the round stone that succeeded it. Of porous volcanic stone; diameter 3⅜ in.

100. An *ulu* of smaller size; material denser than is usually found in the *ulu;* diameter, 2¼ in.

146–7. Though not quite spherical, these stones were, it is claimed, used in the game of bowling practised by the old Hawaiians. They are from the Koolau (windward) side of Oahu.

Stones Used in the Game of Hop-scotch—Kuhela.

97. The game of hop-scotch, an old favorite with the Hawaiians, was called by them *Kuhela.* These stones are liable sometimes to be mistaken for *ulu-maika.* Material: porous volcanic stone; diameter, 2½ in.

99. A coarse porous lava stone; diameter, 2⅜ in.

148. Same as that of 99; diameter, 2⅛ in.

288. Same as 99. The coarseness of the material testifies to the plebian quality of the sport in which the stone was used; diameter, 2 in.

Stone Adzes—Ko'i pahoa.

108. Large sized stone adze (*ko'i pahoa*), such as would be used in felling a tree, or in hollowing it for a canoe. Part of the back is ground smooth, also the edges in part. The material is a dense black basalt. Length, 13¾ in.; width, 2¾ in.

109. Fine pattern; the same as 108; length, 12¾; width at edge, 2⅜ in.

110. Unfinished specimen; edge not ground. The entire surface shows the dents and hollows where the spalls were chipped out. Length, 10¾; width at edge, 4 in.

111. A flat thin blade; dimensions, 8 by 3 3/16 in. at cutting edge; at the handle end, 2⅛ in.

112. A fragment of a very large adze; the handle end broken off; has evidently seen hard service; was once well ground; width at edge, 3¾ in.

113. An unfinished specimen; shows no marks of being ground or smoothed.

115. Fine specimen of the *ko'i pahoa;* dimensions, 8⅝ in. by 2 in.

116. Dimensions, 7¾ by 1⅞ in.

117. The cutting edge has flaked off, as if the material were of inferior quality.

118. The handle end of this specimen was broken off long ago.

119. A battered specimen dug out of the earth.

120. Long and narrow; almost deserves to be called a chisel; dimensions, 8¼ by 1⅝ in.

121–122. Tools that have evidently seen service. Observe the polish on their protuberances.

123. The blade has almost the shape of a broad chisel; dimensions, 7⅝ in. by 2 9/16 in. at edge, tapering at heel to 1⅞ in.

124. Another chisel-like shape. The generic Hawaiian name of the stone is *ala,* the specific name *uliuli.*

125. A fragment of an adze; shows polished surface.

126. Fragment of a rejected specimen of adze (*ko'i pahoa*).

128. This specimen was bought from a Hawaiian carpenter, who had it from his father, a native of Molokai. Its shape marks it as a gouge or chisel. It is also used to bore holes with.

129. Picked up in the road at Kalaupapa in 1879.

130. Has seen much service.

131. A small specimen, that has been much used. Dimensions, 2⅝ in. by 1 3/16 in.

132. Dimensions, 2 by 15/16 in.

134. Adze from Kauai. Notice the convexity of its outer surface, also the angle of its cutting edge. This edge is adapted to cutting soft wood.

135. Adze from Kauai. The edge of this adze is blunter and therefore fit for harder wood than 134.

140. An example showing how the Hawaiians substituted steel for stone: a plane-iron has been mounted on a handle in a manner similar to that in which the stone adze, the *ko'i pahoa,* had been once mounted; a very effective tool.

Stone Adzes with helves affixed.

138. In this specimen is seen the manner of affixing a stone adze on a helve. The helve is of the light but strong *hau* (hibiscus), which plays an important rôle in Hawaiian and mechanic arts when important and extensive work was on hand, as when a *koa* was being felled and fashioned into a canoe (*wa'a*), attendants stood ready with new helves to supply the place of those which might be broken, as well as to lash the adze to its new helve. The usual lashing was cocoanut sinnet (twisted) or twisted cord of *olona,* as in this specimen.

136. The lashing of this specimen is slighter than in No. 138.

139. Small-sized adze lashed to its helve.

141. Stone adze with helve.

142. A large stone adze with helve, such as might be used in felling a tree and in shaping a canoe. It is provided with a wrapper about the stone. This was very commonly done.

Kupa-aike'e.

143. In this large adze the wooden piece to which the adze is lashed is socketed into the helve in such a way as to allow of its being turned from one side to the other and thus enable the workman to cut on one side and then on the other side. This fact gives to this special variety of adze-mounting the name of *kupa-ai-ke'e; i. e.,* the contrivance-to-cut-sidewise, or to cut crooked.

274. A short, stunted Hawaiian adze.

Stone adzes or axes from Oregon.

144. Stone implement, adze, or axe from Oregon, introduced to show, by way of contrast, the marked differences between the Hawaiian and the North American Indian types.

347. Stone-cutting implement, adze, or axe (probably from Oregon). It is shown as another example to illustrate the difference between the workmanship of the Hawaiian and the North American Indian.

Stone Implements for Various Uses—Mirrors.

73. Mirror, termed by the Hawaiians *pohaku kilo,* or *p. kilohi.* When dipped into the water this reflected an image of the human face or form if held in position.

74. This mirror, of larger size, is in a less perfect condition. These specimens are exceedingly rare. These *pohaku kilo* were also used in incantation.

Stone Weapons of Offense or Defense.

103. This finely carved (coral) sandstone was used, flail fashion, as a canoe-breaker. There was at one time, no doubt, a piece of sinnet attached to it. It was no doubt used for other warlike purposes, offensive and defensive.

Sling-stones—(pohaku ma'a).

92. This bluntly fusiform stone was a form largely used by the warriors who used slings in the armies of Hawaii in ancient times.

93. This specimen was dug out of the ground in excavating a cellar at the site of the pumping station in Kalihi, in the suburbs of Honolulu.

94. A sling-stone of more than ordinary size.

276. Sling-stone of the average size.

353. A sling-stone not wrought into perfect shape (*pohaku ma'a*).

Stones used as Bolas.

151. The Hawaiian gave to all stones which they used as bolas the generic name *ikoi.* This *ikoi,* to which they gave the specific *Mahoe-lani,* was perhaps more used by robbers and in private combat than in open warfare between armies. The line, or *aho,* was generally made of cocoanut sinnet. It was a very effective weapon.

152-3. These two stones were tied together by a line of some length and hurled against one's enemy in much the same way that the Patagonian used the bolas. The Hawaiians termed them *Ikoi uwe.*

154. This *ikoi* was used in much the same way as those mentioned in 152. The warrior, or robber, might retain one end of the line in his hand, or he might use it at close quarters as a sling-shot. The Hawaiians gave to it the name *ikoi-hana-kau-luna.*

155. This *ikoi* from Kauai was termed *ikoi-piko,* or *ikoi-pua.* The line would be coiled up in the cup-shaped hollow, and the whole carried hidden in a fold of the *malo,* ready for use at any time. Its consequent closeness to the navel, in the fold of the *malo,* gave to it the name *piko,* navel.

Stones used in Betting Game of Puhenehene.

348-50. These stones, called *no'a,* were used in playing the betting game of *Puhenehene.* A tumble of *kapa* was placed before the player, and it was his rôle to hide the *no'a,* which lay in the hollow of his hand, under one of the heaps into which the *kapa* was crumpled, so that his opponents could not detect under which pile he hid it. There were 5 piles or heaps of *kapa.* The betting was very spirited, and was an essential part of the game.

160-1. These stones are claimed to have been used as *no'a* in the game of *puhenehene* (see numbers 348-50). Their large size must have made the management of them in the game a more difficult matter than when the smaller stone was used. A similar game to that of *puhenehene* was sometimes played in the sand.

Stones used in Grinding, Sharpening, and Polishing.

102. This stone, from Oahu, was used in rubbing down and smoothing woodwork, or perhaps stone implements, a purpose for which its grain well fits it.

95 and 273. These two stones (*pohaku hookala*) were used in sharpening stone implements, adzes, etc. Are called hones or grindstones.

149. This piece of pumice (Hawaiian *ana*) was extensively used as we would use sandpaper, in smoothing and polishing wooden dishes. They sometimes added oil, expressed from the *kukui* nut. The same oil has since been sometimes used as we use linseed oil.

166. This long and narrow splinter of stone, tapering at one end almost to a point, and showing the spall-marks on two sides, was intended for some sort of a drill.

167. This rough fragment of stone, showing the spall-marks of the stone-cutter, was undoubtedly intended for an adze, but was unfinished, perhaps because it is not of the best material.

145, 162, 163, 352. This stone is said to have been used as a cooking stone (*pohaku-eho*). It was heated and then put inside of the fowl, pig, or dog, which was then placed in the *imu,* or oven, thus expediting thorough cooking.

158. *Noni* pounder-stone, *pohaku-ku'i-noni.* The leaf of the *noni* (*Myrinda citrifolia*) was pounded up by fishermen and laid at the bottom of the sea in certain spots where there was coral (*ko'a*) as a lure for fish, who were attracted by it. When the fish had gathered to eat of it the net, *upena lauhulu,* was let down to encompass them. The meat of the *wana,* an echinus that has needle-like spines, was used as a lure in the same way.

Stone Poi Pounders.

75. This is the style of poi pounder in general use on the islands of Oahu, Molokai, Maui, Hawaii, and Kauai; in fact, throughout the group. This specimen weighs, roughly, 6½ lbs.: knob at the top of the handle for the hold. The material, a dark basalt, is called by Hawaiians *ala pe' emalu,* and by others *kai-anu'u.* Height, 8 in.; diameter of base, 5¼ in.

76. Stone poi pounder—Oahu style; weight, 7½ lbs.

77. Stone poi pounder—Oahu style; weight, 8 lbs., 6 oz.

78. Stone poi pounder—Oahu style; height, 8¼ in.; diameter at base, 4 in.

79. Stone poi pounder—Oahu style. The material is called by the natives on Oahu *pahapaha,* and by those of Kauai *makawi,* because the poi sticks to it. Height, 8⅞ in.; diameter, 5 7-16 in.

80. Stone poi pounder—Oahu style. Weight, 7 lbs., 2 oz.; height, 7⅞ in.; diameter, 5 7-16 in.

81. Stone poi pounder—Oahu style. Material gray volcanic basalt; on Oahu called *maono,* on Kauai *kuanu'u halelo.*

82. Stone poi pounder—Oahu style; a slim, elegant pattern. This specimen has evidently been used to triturate bark, probably that of the *kukui, hili kukui.* Height, 7⅞ in.; diameter, 5 in.; weight, 4 lbs., 10 oz.

83. Poi pounder—Oahu style; material a pinkish volcanic basalt, called *pehaku eleku.* Height, 8⅞ in.; width, 4¾ in.; weight, 4 lbs., 10 oz.

84. Stone poi pounder; one of the small sort; by the Hawaiians sometimes called *pohaku wi,* because it was used in time of famine, or when *kalo* was scarce. Its use did not make much noise, and thus did not attract the attention of the public. This sort of pounder is of slighter figure.

85. Poi pounder; small size. Weight, 2 lbs., 14 oz.; height, 6 1-16 in.; width, 3⅜ in.

86. Poi pounder of small size. This has the contour of a large poi pounder, though it is diminutive in size. Material black vexicular volcanic stone. Weight, 2 lbs., 12 oz.; height, 6 1-16 in.; width, 3¼ in.

87. Poi pounder of small size and pattern. Weight, 2 lbs., 3 oz.; height, 5¾ in.; width, 3¼ in.

89. Ring poi pounder of stone, from Kauai. This variety of poi pounder seems to be peculiar to the island of Kauai.

90. Ring poi pounder from Kauai. Material, sandstone.

91. Unfinished poi pounder of stone.

Kapa, the paper-cloth of the Hawaiians, was made from the fiber of the *waoko,* a small tree (*Brousonetia papyrifera,* Hillebrand). This was soaked in water until it became pulpy, and then, being constantly wetted, was beaten out into thin sheets with the *kapa* pounders. This was done on the kapa-log, next mentioned. The round clubs were used first; later, those on which figures are cut. These left water-marks on the fabric.

170 to 217. Kapa pounders; *i. e., kuku-kapa;* wooden; 43 specimens.

Kapa-logs.

218. Kapa-log, called by the Hawaiians *papa kuku-kapa;* material, hard wood.

219. Kapa-log; material, hard wood. The woman who engaged in this work sat on her knees before the log. A dish of water was at hand wherewith to keep the kapa wet.

Awa Drinking Cups.

220. Awa drinking cup, called by the Hawaiians *apu-awa;* material, cocoanut shell. The whitish film on the inside of the cup is caused by a sediment from the *awa. Awa* was made from the root of the *Piper methysticum.*

221-2. Cocoanut cups used in awa-drinking.

Sundry Dishes of Coconut Shell.

223. A polished bowl of coconut shell, such as the Hawaiians would use for salt or any condiment, or as a dish for other purposes on the table.

224-5. Coconut bowls for the table; from the collection left by the Princess Ruth Keelikolani.

Calabashes.

226-7. Small calabashes, such as would be used as an individual poi bowl. By the Hawaiians called *ipu poi.* Size, about 5¾ by 3½ in.

228. Small calabash, with cover, such as might be set aside to keep, or used as an individual poi bowl at a feast.

238. Gourd dish.

230. Water gourd; called by the Hawaiians *hue-wai;* enclosed in a net for convenience in carrying. Its long neck, which gives it a certain resemblance to a decanter, makes it convenient for drinking directly from it.

231. Calabash with net and cover, such as would be used in carrying poi or other food. The net is quite elaborately made, and is partly of cocoanut sinnet and partly of *olona.*

Wooden Bowls.

233. Wooden bowl; material, kou wood; very old. This bowl was made before the lathe was introduced into Hawaii. It was such a bowl as might have been used to contain poi for use at a *luau,* a Hawaiian feast. The possession of such a dish was generally confined to the *alii* class. This specimen was from the estate of the Princess Ruth Keelikolani. Diameter of opening varies from 17¼ in. to a little more.

234. Wooden bowl; material, kou wood. From the estate of Ruth Keelikolani. Mouth, 5¾ in.

235. Wooden bowl; material, *kou;* very old; hand-work; shows modern repair. Diameter of opening, 9½ inches, more or less.

243. Wooden bowl; material, *kou;* hand-made; old pattern. Width of opening at mouth, 7⅞ in.; height, 6 in.

275. Wooden bowl; material, *kou;* hand-made; old; has marks of modern repair. Width of opening, 8⅝ in.; depth, 4¾ in.

235. Small bowl of *kou;* found in a cave; shows modern repair. Mouth, 4⅞ in. to 5 in.; depth, 3¾ in.

237. Wooden bowl of *kou;* very old; has handle; presents marks of repair. Formerly used as an *ipukai,* to hold some sort of flesh cooked with a gravy or soup.

279. Spittoon, or *ipu-kuha;* material, *kou;* has a handle; very old. The ancient kings and chiefs had their spittoon-carriers as well as kahili-bearers. The spittle was carefully guarded lest it fall into the possession of a *kahuna* (priest) and be used as a charm against the life of the owner.

368. Pot de chambre; old; material, *kou* wood; has a handle of the same piece; shows marks of repair with pegs; rare if not unique.

370. *Kilu.*—This cocoanut shell, cut in an oblique fashion, was used in playing the ancient Hawaiian game *kilu.* See account in Hawaiian Antiquities, p. 284.

373. This spear of *kauila* wood is said to have been used in the battle of *Ka-pani-wai,* which was fought in the Iao Valley, Wailuku, Maui, in 1790. Kamehameha was the victor.

Canoes and Paddles (Models).

280. Hawaiian canoe; *wa'a;* material *ahakea* wood; the body in this specimen is all of one piece. Length, 27 in.

281. Paddle; *hoë;* material, *koa.*

375. Paddle; *hoë;* material, *ahakea;* a rudely made specimen.

374. Paddle; *hoë;* material, *koa;* a perfect model. Note the knob on the tip of the blade—a vestige of some old utility, preserved, probably, out of superstition.

282. Canoe; *wa'a;* material of hull, *koa* wood; of rail or top streak, *ahakea* wood; as, also, are the bow and stern ornaments; cross-pieces of outrigger *hau;* the float of the outrigger *wiliwili.* The lashings and the material used in sewing is cocoanut sinnet. This is a perfect specimen. Length, 29 in.

283. Paddle; *hoë;* material, *koa* wood. Notice the knob at the tip of the blade. (See 374.)

284. Paddle; *hoë;* material, *koa* wood. (See description of 374.)

Musical Instruments.

332. Gourd drum; *ipu hula;* an instrument made by joining together two pear-shaped gourds, making a shape like a figure-of-eight. An opening was let in one end to emit the sound, which was elicited by striking the instrument with due force on a padded earthen floor. It was an instrument of great efficiency and effect, used in the *hula.*

324. Gourd rattle; *uli-uli;* an instrument used by the Hawaiians in the *hula.*

311. Cocoanut drum; *puniu;* a small drum made from the shell of a cocoanut; used in the *hula.* The sound was elicited by striking the drum with a twisted thong. (See 309.)

309. Thong used as a drum-stick; *ka;* material, twisted cocoanut leaf.

321-2. Bamboo rattles; *puili;* were shaken, struck together, or tossed from one player to another in the *hula.*

344. Harp; *ukeke;* material, *ulei* wood and strings of cocoanut sinnet. It was tuned to suit the player's ear. The music was elicited by picking with the finger or with a plectrum. It was used in the *hula,* but more commonly in accompanying amorous ditties and in love-making.

323. Nose-flute; *ohe-hane-ihu;* material, bamboo; was played upon with the fingers, while the breath was supplied from the nose; used in the *hula.*

325-7. Musical bamboo; *kaekeeke;* a joint of bamboo open at one end; the tone was elicited by striking the closed end against the solid padded earthen floor. It was used in the hula of the same name.

303. Hula stick; material, *kauila;* used in beating time for the hula performances; Hawaiian name, *laau hula.*

304. Hula stick; used in connection with 303, in a manner similar to a drumstick; material, *kauila.*

307. Hula stick; used in connection with 303, in a manner similar to a drumstick; material, *ulei.*

376. Whistle; *hokeo;* material, a small gourd; was used in the *hula,* though no hula was named after it. The number of holes—besides the embouchure—varied; sometimes there was only one.

Marionettes used in the Hula.

315. Marionette; *ki'i;* personal name, *Maka-ku;* used in the hula *ki'i; i. e.,* the marionette hula; supposed to be of the male sex.

314. Marionette; *ki'i,* or *ki'i* hula; personal name, *Maile-lau-li'i* (small-leafed maile); supposed to be of the female sex.

316. Marionette; *ki'i-hula;* supposed to be a man; personal name, *Puapua-kea.*

317. Marionette; *ki'i-hula;* female; personal name, *Maile Pakaha.*

318. Marionette; *ki'i-hula;* male; named *Nihi-au-moe; i. e.,* Midnight-walker.

319. Marionette; *ki'i-hula;* male; name not learned. All of these marionettes were employed in the *hula ki'i,* or marionette hula, a performance that resembled our Punch and Judy show, and was accompanied by a dance. (See a description of this dance in "Unwritten Literature of Hawaii," by N. B. Emerson.)

260. Calabash, of modern workmanship, containing articles of regalia used in the *Hale Naua,* a secret society founded by King Kalakaua in imitation

of an ancient order of that name. The meetings of the *Hale Naua* were mostly at night, and, if one may accept report, under circumstances favorable to the adoption of the fig-leaf order of garb worn by the ancient gods and our forebears in the Garden. These fig leaves are represented in part by the bits of apparel as shown in numbers next in sequence.

261. A triangular apron, as it seems to be, of old-gold color; gilt fringe on the border; a twelve-pointed star embroidered in the center; provided with tapes to attach it about the body.

262. A cape of yellow cotton; decorated with one black and two red crescents.

263. An apron of yellowish red, or orange-colored cotton cloth; decorated in the center with a twelve-pointed white star.

264. A plain black cape of glazed cotton.

265. A plain cape of slate-colored cotton.

266. A tooth-like instrument, made in imitation of a shark's tooth, set in a wooden handle and provided with a loop of strong cord to pass over the finger.

267-8. These balls of twine are reputed to have played an important rôle in the esoteric rites of the *Halo Naua,* so that the organization came to be popularly known as the "ball-of-twine society." At the expiration of the monarchy the *Hale Naua* also drew its last breath. Many of the former members of the defunct organization hastened to realize a few dollars by selling, not only the fragile regalia, but the secrets of the society to whomever would buy them as "curios." For a description of the real *Hale Naua,* as it once existed, see "Hawaiian Antiquities," pp. 253, 254, and 263.

104. Stone lamp; *ipu-kukui.* These are to be found in great variety; in the rudest form, an unfashioned stone with a hollow in it sufficient to hold the oil of kukui nut or animal fat that was used. Into this oil a wick was introduced. The form of this specimen was a common one.

105. Stone lamp. A flat stone of oval shape, with a hole to receive the oil.

106. Stone lamp; taller than the average.

149. Polishing stone; material, pumice; used in smoothing and polishing a canoe, or a *umeke.*

159. Stick for playing the game of mumble-peg. This sharp stick of hard kauila wood is thrown from a number of positions, in a manner corresponding to our game of mumble-peg, the object being the same as in our game—to have the point stick into the ground. The player did each attitude 5 times. When one player failed the other took his turn. Each player began with the attitude at which he had previously missed, or at the beginning. There were 7 or more different attitudes.

165 and 259. *Pohaku kilo,* divining stone used by fishermen and men of other crafts in gaining luck and enabling them to secure their ends. These stones were superstitiously regarded; yet they were not properly or exactly regarded as gods. This fetish, or stone fish god, was named *Kanuoi.* The prayer used in connection with this fish god was as follows:

	Translation.
Kane - mai!	Come Kane,
E lono i ka leo;	Voice this petition
Kau alo au	Of thy tender scion,
A ka pulapula e nohe ana i ke ao nei.	In thy presence bowing.

Owau, o Mano-ka-lanipo,
Ia Ku, ia Hina,
Ka oukou ola!
Hoopae in mai
Na i' a e kela, keia ano,
I ola ka kukou pulapuia
E nono nei ke ao nei,
Kaniko's, palalaukala,
Haumakaicle, kani-lapu-anaenae.
Amama; ua noa.

In this lower world,
Of Mano-lani-po.
Hail to thee, Ku!
And to Hina, Hail!
Turn hither the fish,
Of this kind and that;
That your scion may live
In this life here below—
Or, with palsy stricken,
Or bedridden, or blear-eyed,
Or in death trance lying,
Accept the Charm!
Let tabu flee!

The ceremonies were performed in a little hut, with pouring and drinking of awa, anointing with coconut oil, etc., while the fishermen waited outside. When the god indicated—by what sign I cannot exactly make out—the nets were cast in the place indicated by the priest, and great was the haul.

168. *Au-lima,* fire-stick, held in the hand and rubbed against 169.

169, 383, and 384. *Au-naki,* fire-stick against which the *au-lima* (168) was rubbed to produce fire.

239. *Tanoa,* awa bowl; from Apia, Samoa. Has four legs, all carved out of the same piece as the bowl.

240. Awa cup, of coconut shell; from Apia, Samoa. Its shape argues that it must have been handed from one person to another without being allowed to rest on the floor or ground. Otherwise its contents would have spilled. This implies an etiquette. The Hawaiian awa cup was shaped so that one could let it stand on the floor, or ground, without spilling its contents. These two specimens, No. 239 and No. 240, were brought from Samoa by the Hawaiian gunboat *"Kaimi loa."*

241. Cup of coconut shell, modern. From the estate of Princess Ruth Keelikelani.

242. Whirl-gig, or a kind of top; a plaything made of three small pear-shaped gourds fixed longitudinally on a stick. The central one is loose; the other two are fixed. A string is passed through a hole in the central gourd and if pulled, when wound up, will communicate to the stick and to the other two gourds a rotary motion.

246. A platter for fish or meat of hard wood; material *koa.*

248–9. Coconut water-bottles from Samoa.

250. Coconut dish with base. Modern.

253 and 254. Carrying-sticks called by the Hawaiians *mamaka;* used in carrying burdens on the shoulder.

255. Paddle, *hoe.* True to the old-time models. Notice the knob at the tip of the blade; a vestige superstitiously preserved. This must have had a utility at some time, perhaps to strengthen the point and to keep it from wearing rapidly when the paddle was used in poling in shoal water.

256. Paddle, *hoe;* material *koa.*

257. Walking stick, *ko'oko'o;* material *kauila.*

258. Old-fashioned digger, *oo.* Such as this was used by the farmers in Hawaii before the introduction of iron.

277. Olona scraper; *iwi-kahe-olona;* material the shell of a turtle. This instrument was used in scraping and cleaning the *olona bark,* to prepare it for being made into lines.

285. Fish god of stone. It is thought to represent *Ku-ula,* a god worshipped by fishermen; a unique specimen.

287. Breeding stones; *iliili-o-Koloa.* These little pebbles are reputed to have the power of breeding and multiplying their number. By count their present number is ninety.

291. Neck ornament; *lei palaca.* A neck ornament worn only by kings, chiefs and people of high rank; suspended from the neck after the manner of the collar and pendent of the order of the garter. It is a whale tooth carved with consummate art, and suspended from a heavy mass of human hair, skilfully plaited into numerous fine cords. Such fine specimens as this are very rare, and are hardly to be found outside of museums.

292. Carved whale tooth; *niho-palaoa;* is without its neck apparel of human hair. Perhaps it was never furnished with it.

296. Carved whale tooth, a neck ornament; *niho palaoa.*

297. Carved ornament for the head, part of a *lei po'o.* The materal is some other bone than whale tooth. The size is diminutive.

293. Carved ivory beads, attached to a small carved whale tooth of the fashion described in 292. This string of beads was worn, it is said, by Keepuolani; from her it came into the possession of Manuha'aipo, the grandmother of Kahiamoe. Manuha'aipo took care of the apparel of Keopuolani. The twelve oval beads and the pendant *niho* are of whale tooth. Such a string of beads as this is very rare.

294. Carved *kukui* nuts for a necklace. This was obtained from an inmate of the Lunalilo Home.

298. Bracelet, *kupe'e;* of whale tooth; an ornament highly prized by the ancient Hawaiians. This has two holes for the string.

299. Bracelet, *kupe'e;* whale tooth. This specimen has three holes for the string.

300. Bracelet, of whale tooth. Three holes for the string.

301. Skirt; narrow strips of pandanus leaf are strung together and bound about the waist. From Micronesia.

302. *Hula* skirt. Hawaiian. This skirt *pa-u hula,* was made by a hula girl, and is such as was used in dancing in the ancient times. They also used kapa, a more elegant and stylish attire.

328, 329, 331. Anklets, *kupe'e wawae.* Used in the hula.

330. Feather cape. This was made in imitation of the old-time feather capes of royalty. In this the feathers are, of course, from common fowl, being dyed to suit the purpose. This cape figured at the coronation of King Kalakaua.

33. Sandals, *ma'a.* These were much used in Hawaii as a defense against the cruel *a-a.* The material is the leaf-stem of the *ti* plant.

334 and 342. Net to carry calabash, *koko.* Of coconut sinnet.

335. Net for calabash, *koko,* of *olona.*

336. Net for calabash, *koko.* In part coconut sinnet and in part *olona.*

337, 339, 341. Net for calabash *koko.* Of *waoke,* the bark from which kapa cloth is made.

338. Net for calabash, *koko.* Of *olona,* coconut sinnet and horse hair.

343. Mat used to lay upon the floor to furnish a seat in the modern *hale Naua* services.

346. Arrow, *pua,* made from the flower stalk of the sugar-cane; darted along the ground in the Hawaiian game called *ke'a pua.* This game was much in vogue many years ago.

351. Massage stick, *laau lomidomi.* This stick was designed for use in scratching the back.

366. Pillow, from Samoa. A joint of bamboo is supported on two forked sticks.

385. Drill; from Tarawa, Micronesia.

386–7. Knife of shark-teeth, from the Gilbert Island.

389, 148. Hop-scotch stone, *pohaku kuhela,* now called *kini-wa.*

146–7. Bowling stones, *ulu;* though not quite spherical; these stones were used in the game of *ulu-maika.*

390 to 399. Arrows from Solomon Islands; material, bamboo. The shaft is not feathered; tipped with hardwood point; possibly poisoned; delicately etched with black lines at the nodes along the shaft.

400 and 408. Spear; from the New Hebrides; material, hardwood, tipped with iron, probably used in fishing.

402 and 403. Spear; a slender shaft of hard, dark wood; tipped with iron; probably used in fishing. From New Hebrides.

401 and 407. Spear; from the Solomon Islands; a decorated bamboo stock, to which is attached a long point of palm wood; used for hunting or hurling in war.

409 and 410. Spear; from Samoa (?); purchased in Honolulu. A slender shaft of light-colored hardwood; multi-barbed point; the tail end spatula shaped; evidently intended for hurling.

404. Spear; from Gilbert Island, Micronesia a shaft of cocoanut wood, set on four sides with shark teeth; each shark tooth perforated; a murderous weapon used in war.

405 and 406. Sword-spear; from the Gilbert Islands, a powerful shaft of cocoanut wood; beset on two sides with large shark teeth; provided with a guard, and wrapped about the handle with some rough fish-skin.

411. Carved staff; from Samoa; probably a ceremonial staff; carved like a blade at one end.

412. Mace, or club; from Samoa; carved. Some one has engraved on it a name, very likely that of the owner.

413. A short club, or mace; from Samoa; such as they used in battle; carved into diamond-shaped teeth on the edge.

414. Club for use in battle; from Samoa; carved in what may be called the palm-top fashion; with zigzag lines, filled in with lime and a gummy matter.

415. Carrying stick; Hawaiian; somewhat broken at the ends. Used for carrying burdens on the shoulder.

417–9. Spear; from Samoa; used in catching a prisoner. The carved end is thrust into the mop of a man's hair and being twisted about, holds him securely.

420. Wand or staff; from Samoa; ends once provided with a jut having a hole in it, into which feathers were put; probably used as a ceremonial wand.

421. Wand, or staff of ceremony; from the Caroline group, of light wood, probably hibiscus; wrapped at intervals with red worsted, and carved with geometrical figures, of a diamond shape.

422. A paddle; from Queen Charlotte's Island, Alaskan coast; a well-

fashioned blade. It was used in propelling a boat-like canoe, which was made out of a single tree. The Indian tribe was called Haida.

423. A bow; from the New Hebrides; dense hardwood. It lacks string.

424. War club, from Solomon Island; dense hardwood; nicely carved.

425 and 427. War club, or halberd, from the Solomon group; of dark hardwood; finely carved.

428. War club; of about the same pattern as 425, but of lighter wood and carved with less skill; the work evidently of an amateur.

429 and 430. War club, from the New Hebrides; of dark and very heavy wood; well fashioned and carved; somewhat ornamented; has been slightly splintered, perhaps by a heavy blow in battle. The sinnet about the grip still remains.

431-3. War club, from the New Hebrides; the pattern of the club end is different from 429; material the same.

434. War club, from the New Hebrides; literally a club; its pattern is unique; material same as 431.

435-47. War club, from the New Hebrides; plainly fashioned; no ornament.

448. War club, from the New Hebrides; plainly fashioned; has an etching of wave-lines at the club end.

450. War club, from the New Hebrides; plainly fashioned; no ornament.

451-4. Battle-axe or tomahawk, from Ambrym, New Hebrides. The handle is evidently an old war club that has been fitted to the cheap iron axe-head; in the hands of a wild man no doubt a very effective weapon. The head is elaborately carved into a basket form, which must have been simply for display; as a protection to the hand it was nil; its aid to the grip worse than useless.

455-63. Battle-axe, from Montague or Mann Island of the New Hebrides. The head of this specimen is fashioned into a conical figure that has a considerable resemblance to the acorn, though cut transversely by a deep furrow.

464-5. Battle-axe, from the New Hebrides; the carving of this is the head—a flattened cone.

466. Tobacco pipe; Kiseru; from Japan; a form of pipe much used by the Japanese in this country for smoking tobacco, and one introduced by them from Japan. This was procured from a newly-arrived immigrant at the Quarantine Station.

467-8. Sacred rings from Olapat, Ngatick, of the Caroline group of islands. These are said to have been exhumed from the base of a shaft of basalt, which was adored as a divinity under the name of Olahst. The material is evidently the whorl of some good-sized sea-shell.

469. Necklace, from Ruk; the pink beads are from some sea-shell, the black ones of cocoanut shell.

470. Tobacco pipe; Hawaiian; found in a burial cave along with old-fashioned glass beads of foreign manufacture, evidently put with the body as a burial object.

473. Necklace of glass beads; found in an old burial cave in Kalini, along with a tobacco pipe.

474. Musical bamboo; Kackeeke; when the closed end is struck vertically against the ground or a solid, non-resonant floor, this bamboo emits a clear, musical tone; used as an accompaniment in the *hula kackeeke*. If properly selected, a set of these bamboos would have served to play a tune, as did a set of bells in the hands of the "bell-ringers" in old times in America.

472. Calabash cover.

475. Opium pipe; by the Chinese called yen tan; obtained in Honolulu.

476. Opium container; used in connection with the pipe.

477. Scales for weighing opium; used in connection with the pipe in an opium den. These things are all of Chinese importation and use.

478. Spatula used in handling the opium, in an opium den as well as in the dose.

479. Lamp used by the opium sucker. It was kept alight and at his side.

127. Polishing stone; *pohaku hookala;* used in sharpening a tool or polishing a piece of woodwork.

372. Squid-hook sinker; *pohaku lu-he'e;* the matrix of this stone is dark and sparkles with olivine.

369. Bowl; material, kou; shows marks of repair with pegs. This shows marks of having been in a lathe at some state of its existence.

480. Canoe ornament; *Manu*-bird; this object is introduced as an illustration of the artistic and mechanical degeneracy that has befallen the canoe and all that relates to it.

251-2. Cocoanut dish, with base of the same material; modern; from the estate of Princess Keelikolani.

493. Trumpet; Hawaiian; such as was used in ancient times to call the people together for war, or work, or pleasure, and in modern times for work or worship.

492. Cocoanut dish; Hawaiian; rough make; modern.

491. *Olona;* the fiber much used in making fish-lines and nets, and for fabricating the mesh which was the groundwork of the feather capes, etc.; the Hawaiian hemp.

490. Decorative cord, from Ruk; narrow strips of white banana (?) fiber and of black bark of some sort are braided about a nucleus.

361. Squid-hook sinker; *loho-lu-he'e;* material, a crystalline limestone, which is very appropriately called *pia*—arrowroot—by the Hawaiians.

494. Spine of echinus; used as a slate pencil, in the lack of that article, by the school children of Hawaii in the olden times.

495. Board used to give a water-mark to tapa; by pressing the tapa when wet onto the grooved surface of this board the tapa had a water-mark imprinted on it.

496. Section of submarine cable connecting Honolulu with the United States; landing of the first section of the Pacific cable at Waikiki, December 28, 1902, connecting with San Francisco. The section connecting with Midway, Guam, and the Philippines was completed July 4, 1903.

497-8. Poi board; *papa pu'i poi;* Hawaiian; ahakea wood. This was the hollowed plank on which the Hawaiian made his hard poi, by pounding the steam-cooked taro tuber into a dough-like mass. This was later mixed with a small quantity of water and kneaded into a pasty mass of the proper consistency.

499. Hula drum; *pahu hula;* material, a hollowed log of cocoanut; a diaphragm is left in the cross section of the log to complete the hollow. The head is of shark-skin; the lashings are of cocoanut sinnet. Such drums as this were also used at one time in the temple (*helau*) service, at which human sacrifices were made.

500. Club, from Samoa; a hardwood club of a pattern quite common in Samoa.

501. Battle-axe, from the New Hebrides. A hardwood club has been affixed to a poorly made axe-head.

244. Gourd dish, from the estate of Princess Ruth Keelikolani; of small size.

483-4. Check to support canoe; *Paepae;* material, soft wiliwili wood, the wood as the outrigger.

485. Tomahawk or battle-axe, from Sandwich Islands, of the New Hebrides group.

486. Musical bamboo; *kaekeeke;* Hawaiian; used as an instrument of accompaniment in the *hula kaekeeke.*

487. Ceremonial staff, from the Caroline Islands.

488. Hairpin, from Ruk; two pins of wood held together by means of beads or rings of cocoanut shell slipped over the end.

489. Hair-comb, from Ruk. A number of long wooden pins are bound together with string; ornamented with bead work.

490. Decorative cord, from Ruk. A central core is braided about with narrow strips of banana fiber or some bark, perhaps that of the hibiscus, forming a plaid pattern.

List of photographs representing buildings, ancient and modern, and data of church, settlement, and school work being carried on by the Board of the Hawaiian Evangelical Association, Honolulu, Hawaiian Islands.

1. Alexander Parsonage, Wailuku, Maui; Birthplace of Gen. S. C. Armstrong; Old Missionary Homestead.

2. Alexander Social Settlement, Wailuku, Maui.

3. Girls from Alexander Settlement; Class in Needlework.

4. Alexander House, Wailuku, Maui; Home of Settlement Workers.

5. Chinese Church, Wailuku, Maui.

6. Kaahumanu Hawaiian Church, Wailuku, Maui; Church Organized 1838; Old Building Remodeled.

7. Kohala Seminary, Kohala, Hawaii.

8. Kohala Hawaiian Church, Hawaii; Organized in 1828; Old Building Remodeled.

9. Lihue Union Church, used by two congregations—one in Hawaiian and one in English.

10. Members of Kauai Evangelical Association, 1909.

11. Parsonage at Waimea, Kauai; probably Oldest Building on Kauai; Old Missionary Homestead.

12. Old Church Building at Waimea; Built of Coral-stone; Church Organized 1825.

13. Kawaiahao Church, Honolulu; built 1839.

14. Annual Meeting Hawaiian Evangelical Association, representing 101 churches.

15. Haili Hawaiian Church, Hilo, Hawaii, of which Rev. Titus Coan was for so long the pastor.

16. Waiakea Social Settlement, Hilo, Hawaii.

17. Hilo Boarding School, Hilo, Hawaii; established 1836.

18. Palama Social Settlement, Honolulu.

18½. Palama Settlement Children.

19. Japanese Church and Sunday School, Honolulu.

20. Japanese Christian Endeavor Society.

21. Chinese Church in Honolulu.
22. Faculty Kawaiahao Seminary, Honolulu.
23. Students Kawaiahao Seminary.
24. Kaumakapili Hawaiian Church, Honolulu.
25. Memorial Hall, Oahu College, Honolulu.
26. Lunalilo Home, Honolulu; for aged Hawaiians.
27. Portuguese Church, Honolulu.
28. Kawaiahao Hawaiian Church.
29. Central Union Church, Honolulu.
30. Original Frame House, Mission Premises, Honolulu; erected 1821.
31. Moiliili Hawaiian Church; old building still in good repair, and used for services regularly.
32. Lahaina Social Settlement; "Governor's Guards."
33. Baldwin House, Lahaina Social Settlement; Old Mission Homestead.
34. Baldwin House; Chinese Sunday School.
35. Lahaina Social Settlement; "Bonnet Brigade."
36. Lahaina Kindergarten.
37. Lahaina Settlement Group.
38. Lahainaluna Seminary.
39. Memorial Hall; Lahainaluna Seminary.
40. Campbell Memorial Park; Site of Old Mission House.
41. Hale Aloha, Lahaina, one of the oldest Mission Buildings; recently renovated and used for regular services.
42. Parsonage of Hale Aloha, in Campbell Memorial Park.
43. Wainee Hawaiian Church, Lahaina, Maui; graves of Ancient Chiefs in foreground.
44. An Old Hawaiian Couple after the day's work is over.
45. A typical Hawaiian Woman.
46. A typical Hawaiian Man.
47. A typical Hawaiian Man.
48. A typical Hawaiian Chapel, Manoa Valley, Honolulu.
49. Racial Types in Kawaiahao Seminary, Honolulu.
50. Chinese Sunday School Picnic, Mid-Pacific Institute Grounds, Honolulu.
51. Japanese Boarding School, Honolulu.
52. Mills Institute Brigade, Mid-Pacific Institute Grounds, Honolulu.
53. Chinese Students' Alliance, Honolulu.
54. Fort Street Chinese Church, Honolulu.
55. A Chinese Patriarch; Tam Lin Kong and Family, Honolulu.
56. Chinese Pastors and Evangelists, Honolulu.
57. Aala Chinese School, Honolulu.
58. The Lucky Thirteen; Li Kong Fi's Family, Honolulu.
59. Family of Ho Kwai Tak, Chinese Evangelist, Honolulu.
60. Typical Variations of Race; Mid-Pacific Institute, Honolulu.
61. Chinese School in Kauai.
62. Chinese School on Kauai.
63. Chinese School on Kauai.
64. Rev. T. Okumura and Family, Pastor Makiki, Japanese Church, Honolulu.
65. Japanese Church, Ewa, Oahu.
66. Kakaako Social Settlement, Honolulu.
67. Japanese Night School, Ewa, Oahu.

68. Ewa Japanese Church.
69. Group of Hawaiian Pastors.
70. Japanese Christians at Hilo.
71. Japanese Sunday School, Ewa, Oahu.
72. Cadets, Japanese Boarding School, Honolulu.
73. Japanese Evangelist's Class of Makaweli Plantation, Kauai.
74. Refreshment Awning at Association Meeting, Kauai; sides made of braided cocoanut leaves.
75. Building at Kamehameha School; Manual Training School for Hawaiians, Honolulu.
76. Camps and Dormitories at Kamehameha Manual Training School, Honolulu.
77. Printing Room at Kamehameha School.
78. Forge Room at Kamehameha School.
80. Dynamo Room at Kamehameha School.
81. Lathe Room at Kamehameha School.
82. Parade on Campus, Kamehameha School.
83. Kamehameha Girls' School.
84. Bishop Memorial Chapel.
85. Battalion Officers, Kamehameha School.
86. Kaluaaha Hawaiian Church, Molokai; one of the oldest and largest church structures.
87. Council at Organization of Kahului Union Church; seven different nationalities; thirteen different denominations.

Church Mission Work in Hawaii.

American Board Mission to Hawaii.

The American Board of Commissioners for Foreign Missions began its work in the Hawaiian Islands in 1820 and continued till 1863, when it withdrew. During that time it sent out 140 missionaries, spent $1,577,950.27, and made 53,583 converts.

The Hawaiian Evangelical Association, which has continued the work of the American Board, comprises 7,189 members, organized into 100 churches, as follows: 67 native, with 4,536 members; 10 English-speaking, with 1,368 members; 3 Portuguese, with 219 members; 6 Chinese, with 318 members, and 14 Japanese, with 748 members. Its Sunday schools count 8,783 members, and the young peoples' societies of Christian Endeavor 2,862 members. Under its control are 6 social settlements, 6 boarding schools, and 3 religious monthlies. It carries on missionary work among 30,000 Hawaiians, 70,000 Japanese, 17,000 Chinese, 17,000 Portuguese, and 41,000 Anglo-Saxons and others. Its working force consists of 6 superintendents, 6 field agents, 70 pastors, 16 evangelists, 6 settlement workers, 5 kindergarten workers, and 3 district nurses. Its church property is valued at $532,689, with endowment funds of $268,296.95. Its annual expenditures amount to $60,000, and in 1908 it gave $17,639 to benevolences.

List of Papers, etc., Describing Work Under Hawaiian Board.

Two copies Missionary Album.
Thirty copies Jubilee issue of The Friend.

FAMILY GROUPS OF THE SAMOANS

File of The Friend, January, 1908, to May, 1909. November, 1908, lacking.

File of Ka Hoaloha (Hawaiian) June, 1908, to May, 1909. August, 1908, lacking.

File of The Tomo (Japanese), July, 1908, to March, 1909. November, 1908, lacking.

Fifty copies Annual Report Hawaiian Board, 1908.

Twenty-five copies Annual Report Hawáiian Board, 1907.

Copies of The Oriental Student.

PEOPLES OF THE SAMOAN ISLANDS.

FAMILY GROUP OF THE SAMOAN ISLANDERS, NAVIGATOR ARCHIPELAGO, SOUTH PACIFIC OCEAN.—The Samoans are of the brown Polynesian race which at some early period spread over the Pacific to numerous widely separated islands and reached west to within 1,800 miles of the South American continent. The Samoan Islands were visited by the Dutch navigator Roggoveen in 1722, and named by Bougainville in 1768. They are village people, living like the Hawaiians along the coasts of their tropical islands in comfortable palm-roofed, well-constructed houses, and ruled by a hereditary chief. Breadfruit, bananas, taro, potatoes, and cocoanuts furnish the principal food supply, and fish are eaten. The only domesticated animal is the pig. The Samoans are robust and active, their warlike exercises with club and spear and their constant practice with the canoe paddle developing a fine physique. They are cleanly and delight in flowers and perfumes. In wood working the men excel, building elaborate houses, large canoes, and carving out bowls, dishes, clubs, and spears of the Samoan chestnut. The women weave mats of the finest texture, and beat out bark cloth of strong fiber with corrugated clubs, decorating the fabric with native designs in color.

The Samoans have a drink called kava, made from the root of a pepper plant, prepared in wooden bowls and drank in a ceremonial fashion. The group illustrates a people of nearly pure race, living on a tropical island and depending almost exclusively for subsistence and the arts of life upon the bounties of the vegetal kingdom.

Designed by W. H. Holmes; modeled by U. S. G. Dunbar.

Samoan Man (oil painting).

Samoan Woman (oil painting).

OBJECTS CONNECTED WITH SOCIAL LIFE.—The central exhibit is a house model accurately built to show the structure. Surrounding it are articles illustrating the social life of this interesting people, consisting of clubs, spears, adzes for canoe and house building, cups of cocoanut shell, bamboo pillows, the kava bowl, cups, strainers, and the root used in preparing the drink called ava or kava, which is drunk ceremonially, and the drum used in the dance.

Collected by Admiral Charles Wilkes, U. S. N., A. B. Steinberger, Admiral L. A. Kimberley, U. S. N., Lieut. T. Dix Bolles, U. S. N., and W. H. Phillips.

BARK CLOTH.—The Samoans are especially noted for their manufacture of tapa, or bark cloth, which they use for clothing, for partitions in houses, for blankets, and for other purposes. It is made by beating out bark with a ridged club, and is decorated with colored earth, the pattern applied by placing a relief form under the cloth and rubbing the color on with a pad or with the

hands. The design is commonly a palm leaf on the body of the cloth and conventional patterns on the border. The white shaggy mat was a present from Malietoa, King of Samoa, to President Cleveland.

Collected by Admiral L. A. Kimberley, U. S. N., and W. H. Phillips.

Textile Work.—The Samoans are skilled in making mats, baskets, and fans from pandanus and palm leaf, these plants yielding excellent materials for the purpose. Mats are made of exquisite fineness and pliability, and are valued as heirlooms. A small species of parrot kept in a cage furnishes the red feathers, which are applied to the borders of fine mats. Baskets are woven in checker designs in black and natural colors, and fans in beautiful forms and patterns are constructed.

A few plates, a "talking stick" held in the hand by orators, and fly-brushes, which are a badge of rank, are also shown in the case.

Collected by Admiral Charles Wilkes, U. S. N., Admiral L. A. Kimberley, U. S. N., Lieut. W. E. Safford, U. S. N., and E. H. Richards.

Photographs by U. S. Fish Commission.

Houses of the Samoans, Apia, Samoa.
Native House of the Samoans, Apia, Samoa.

THE NATIVES OF GUAM.

Photographs by U. S. Fish Commission.

Native Houses along a street. Agana, Island of Guam.
Native Houses of Guam. Marianne Islands.
Native Family of Guam. Marianne Islands.
Natives of Guam. Marianne Islands.
Bamboo House, rude cart, and group of natives of Guam. Marianne Islands.

HISTORY OF PHOTOGRAPHY.

This series was prepared by T. W. Smillie, of the United States National Museum.

In the thirteenth century the camera obscura was invented, it is said, by Bacon, and probably more or less improved by Porta in the sixteenth century. The alchemists discovered that chloride of silver was blackened by light, but no use seemed to have been made of this discovery until the year 1777, when Scheele photographed the solar spectrum by projecting it upon a sheet of paper which was previously dusted over with pulverized lunar caustic.

In 1802 Wedgwood and Davy made photographs by placing a man in strong sunlight so that his profile was projected upon the wall. A sheet of paper which had previously been immersed in a solution of nitrate of silver and dried was then pinned upon the wall to receive the image. This, after a considerable exposure, produced a profile portrait in white upon a black ground. They also obtained impressions of objects in the solar microscope upon paper prepared in the same way, but up to this time no means had been found to fix the image, and it remained for Joseph Nicephore Niepce to make the first permanent photograph or heliograph. This was done by coating a plate with

asphaltum, exposing the same in the camera, and then washing away the unaltered parts with essential oils. This was done in 1824.

In the year 1829 Niepce and Daguerre entered into partnership and carried through a long series of experiments which culminated (after the death of Niepce) in the perfection and publication of the daguerreotype process in 1839. This was followed by the first negative process, which was invented by H. Fox Talbot in 1841. These negatives were made upon iodized paper, and from them prints were made upon plain silvered paper.

Next followed the glass plate negative with albumen in 1848, then the glass plate with collodion in 1851, and in 1871 began the gelatine-bromide dry-plate photography of the present day.

This series represents only a few of the great steps in photography.

The asphalt etching process invented by Niepce in 1824, and now used in some of the photo-mechanical processes.

The Daguerreotype invented by Niepce and Daguerre (the process being published by the latter in 1839), is a picture of extreme delicacy and beauty. It is produced as follows:

A polished silver plate is treated to vapors of iodine and bromine, and then exposed to the image in the camera. The picture is then developed with vapor of mercury, fixed in a solution of hyposulphite of soda and toned in double hyposulphite of soda and gold.

The discovery of the solvent action of hyposulphite of soda upon the silver haloids by Herschel was of immense value in the silver processes.

The Talbotype was invented and patented by H. Fox Talbot in 1841, and appears to be the first practicable process in which a negative was made solely for the purpose of producing prints. It was made on paper, sensitized with iodide of silver and developed with gallic acid.

The prints were made on plain chloride of silver paper.

In the Technologist for 1848, Niepce de Saint Victor published his mode of applying albumen to glass for making negatives.

In the year 1851 the collodion process on glass was invented and created quite a revolution in the art.

One of the first permanent photographs printed from an etched metal plate which was coated with asphalt exposed in the camera and developed with essential oils, by Joseph Nicephore Niepce.

The last page of the Contract between Niepce and Daguerre, for combined efforts in research in Heliography. Signed in 1829.

DAGUERREOTYPE.—As invented by Daguerre before the discovery of the gold-toning process.

Daguerreotype of Daguerre, made by C. R. Meade, and loaned to the U. S. National Museum by Mr. Meade's niece, Mrs. Sarah M. M. Valentine.

Early albumen vinette of Mr. Chas. R. Meade, of New York, who made the accompanying portrait of Daguerre at Daguerre's Chateau.

Daguerreotypes made after the discovery of the gold toning process.

Panoramic daguerreotype of the Harbor of San Francisco made about 1852.

Stereoscopic daguerreotype made by Langenheim.

Stereoscopic albumen-glass positives made from albumen negatives.

Prints made from old albumenized-glass negatives before the introduction of collodion.

Series of negatives and prints made by the talbotype process.

Talbotype print made by the inventor of the process.

Portrait of J. H. Fox Talbot, the inventor of the talbotype or Calotype process.

Albumen print made from old talbotype negative.

Ambrotypes or collodion positives on glass.

Melainotype made by Peter Neff, the inventor of the method.

Leaf prints, negative and positive, made on albumenized paper in 1861 by J. W. Osborne.

History of the Collodion Process on Glass.

The collodion process on glass consists in combining sulphuric ether and alcohol, dissolving pyroxyline in it, and adding soluble iodide and bromide.

A glass plate is coated with this and immersed in a solution of nitrate of silver, exposed in the camera, and developed with ferrous sulphate.

The prints were made by coating paper with albumen containing soluble chloride, and then sensitizing with nitrate of silver, and finally toning with chloride of gold and fixing in hyposulphite of soda.

The vitrified enamels are photographs transferred to porcelain, then covered with glass flux and burned in a muffle.

It may be mentioned that the first three pictures in this case represent the beginning of artistic design in photographing from life.

Studies from Life, by O. G. Rejlander. Wet collodion negatives printed on albumenized paper, 1858.

Albumen prints from wet collodion negatives.

Albumen print from gelatine bromide negative.

Albumen prints from Azalin color sensitive plates, by Kurtz.

Vitrified photographs on porcelain, by Lafon de Camersac, the inventor of the process.

Photograph on porcelain.

Portrait of S. F. Baird.

Portrait of R. E. Lee.

History of the Carbon Process.

The carbon print is made by adding pigment to bichromatized gelatine, paper is coated with this, exposed under a negative, then attached face down to another paper with waterproof paste and developed from the back with warm water.

Carbon Print. The first publication in carbon in the United States, by W. Kurtz.

Carbon print, by Kurtz.

Carbon print, by Rockwood.

Portrait study by H. P. Robinson, made with a diffusion lens, 1866, printed in carbon by Swan, the inventor of the Swan Carbon process.

Carbon print, by Swan.

Carbon print, by Pouncy, 1862.

Portrait in carbon, by Mrs. Cameron.

Portrait in carbon, by Mrs. Cameron.

Carbon print, by J. W. Osborne, Pouncy's process.

History of the Platinum Printing Process.

The Platinum printing process, introduced at a time when men of taste were trying to combine art with photography, aided this matter very much.

Many men, after devoting a great deal of thought and labor in the composition of a picture, were disappointed when they saw the results in a glossy print.

The Platinum paper is coated with potassic chloro-platinite and ferric oxalate, and must be dried quickly. After printing, it is developed in a solution of oxalate of potash.

The bromide and chloride of silver and gelatine developing papers are, on account of their similarity in appearance to the platinum and their reasonable prices, in a great measure superseding the platinum.

These papers are coated with bromide or chloride of silver in emulsion with gelatine, and require very little light to print. After printing they are developed in solutions very much like those used for developing dry plates, and fixed in hyposulphite of soda.

Platinum portrait, by F. Hollyer.
Platinum, by Hollyer.
Platinum portrait of F. Hollyer.
Platinum landscape, by Walter Wilcox.
Platinum portrait group, by Frances B. Johnston.
Platinum pictures, by H. P. Robinson.
Platinum portrait of H. P. Robinson.
Platinum portraits of Dogs, by W. O. Locke.
Velox prints, by the Eastman Company.
Print on Royal Bromide paper, by the Eastman Company.
Pictures on Silver-chloride and Gelatine developing paper, "Cyko," by Anthony and Scoville Co.

History of Scientific Photography.

This series, on account of the limited space, shows only a point here and there of the great advancement of photography as applied to scientific work.

In Lunar work we show a photograph of the Moon made in 1865, and a portion of a recent photograph of the Moon which was taken in sections.

A photograph of the Solar spectrum, made in 1868, and part of the great 30-foot normal Solar spectrum by Rowland, and the great invisible spectrum beyond the red, by S. P. Langley, and a small direct photograph in color of the normal spectrum, by Lippmann.

One Solar corona photograph, a few photomicrographs, and some of the results of the Langley Telephoto-theodolite camera.

Photograph of the Moon, by Rutherford, 1865.
Recent Photographs of the Moon, by Professor Ritchie.
The Bridges-Lee photo-theodolite, with two record prints.

Telephoto-theodolite camera, designed by Mr. S. P. Langley. These cameras were used in pairs, placed on a base line ninety or one hundred feet apart, and properly oriented and connected electrically.

The person at camera A, noting and recording the direction and velocity of the wind, aims at the bird, pulls the trigger at the right moment, thereby taking the pictures in both cameras simultaneously, and automatically record-

ing the altitude and azimuth, the assistant at camera B having nothing to do but keep his camera pointed at the bird. All this being done in the fraction of a second, the rapid changes of the bird's position can be very closely followed and recorded.

Photographs of Buzzards, made with Mr. Langley's Telephoto-theodolite camera.

Photographs of the Langley Ærodrome in Flight, made with Mr. Langley's Telephoto-theodolite camera.

Tele-photograph of the Statue of Freedom on U. S. Capitol dome, made at a distance of one-third mile.

Photographic print made by exposing the paper (on which the *Washington Evening Star* is printed) under a negative, without any chemical treatment.

Photographic print made on poplar wood through a stencil without any chemical preparation.

Photograph of the Solar Spectrum, by Rutherford, 1869.

Part of the recent thirty-foot photograph of the Solar Spectrum, by Prof. Rowland.

S. P. Langley's photograph of the Infra-red Solar Spectrum of a 60-degree salt prism, with bolograph energy curves.

Apparatus in position as used by the Smithsonian Eclipse Expedition at Wadesboro, N. C., 1900.

Coelostadt, with objective and thirteen-inch prism of the great 135-foot telescope, Smithsonian Eclipse Expedition.

Photograph of the Solar Eclipse of 1900, by T. W. Smillie, on the Smithsonian Eclipse Expedition, with a telescope of 135 feet focus.

Section of the International Photographic Star Chart.

Solar Microscope as used in Photography.

Photo-micrograph of thin section of crystalline rock by polarized light, 150 diameters.

Photo-micrograph of transverse section of wood, Pinus Ponderosa-Dougl., 100 diameters.

Photo-micrograph of transverse section of wood, Pinus strobus, 100 diameters.

History of the Evolution of Color Photography.

This group shows, in addition to the real color photographs, some of the shifts that photographers were driven to by the demand for color in the picture.

They began by tinting the cheeks in the daguerreotype and ambrotype with dry powdered color. Next the silver prints on paper were entirely worked over with water color.

Then translucent albumen prints were mounted on glass and colored from the back, and finally transparent positives were made on glass by the collodion and other methods; then the outlines were traced on paper and filled in with color and mounted on the back, or the positive film was stripped from the glass and mounted over the color sketch. All of these are interesting as steps leading up to the direct photograph in color, some specimens of which are shown in this case.

1. Photograph in colors from the original painting, by M. Miley & Son, Lexington, Va.

2. Direct Photograph in color of the Solar Spectrum, by Lippman.

3. Instrument for viewing defraction color photographs.
4. Defraction color photographs, by Prof. R. W. Wood's process.
5, 6, and 7. Photographs colored by hand.
8. Albumen Print on Glass colored from the back.
9. Gelatine-bromide print on Celluloid, colored from the back.
10. Collodion Transfer Portraits, mounted over a color sketch on paper.
11. Woodburytype stained from the back.
12. Woodburytype, Trafalgar Square at Night, with yellow stain from the back, by Marten.
13. Reproduction from a photograph representing Fire-light and Lamp-light effects, by Henry Essenhigh Corke.
14. Composite Heliochrome, by Ives.
15. Composite Heliochrome, by Ives.
16. Ruled Screen Color Photograph, by the Macdonough Joly process.
17-25. Color Photographs, by the starch-grain color screen process, from a painting.
17-25. Color Photographs, by the starch-grain color screen process, from nature.
26. Author of the Hoosier Schoolmaster; bromide enlargement from the original, by L. Bernie Gallaher.
27-29. Bromide Enlargements, untouched.
30. Bromide Enlargement from color sketch, by E. Siebert.

History of the Development of the Photographic Camera.

The first photographic camera of which we have any account was simply a darkened room, the sunlight being reflected through a window by means of a mirror casting an image of the subject upon a sheet of sensitized paper. The next was a plain box wth a plateholder fitted to the back, the lens being mounted in a tube and inserted in the aperture in front so that it would slide in or out as a means of focusing. Such was the camera used by Niepce and Daguerre in their early experiments, but in 1839 we find Daguerre using a camera composed of two boxes, one sliding within the other, controlled by a brass sliding rod underneath.

Then followed the camera with stationary front, the back sliding upon its base, with a set-screw and connected with the front by means of a bellows. From this point the portrait and landscape cameras diverged, the former having many attachments added for convenience, making it too heavy to be portable outside of the studio, and the latter growing always lighter and more compact, yet still retaining all of the necessary adjustments.

1. Machine for Polishing Daguerreotype Plates, 1851.
2. Daguerreotype Plate Vise.
3. Daguerreotype Iodine Box.
4. Improved Daguerreotype Bromine Box, 1853.
5. Daguerreotype Mercury Chamber.
6. Buff Stick for Polishing Daguerreotype Plates.
7. First Daguerreotype Camera made in the United States, 1839.
8. Daguerreotype Camera used about 1845.
9. W. H. Masters' Solar Camera for making Enlarged Prints.
10. Stereoscopic Daguerreotype Camera, 1854.

11. Magazine Camera for making Stereoscopic Negatives with one lens used with the Tanen dry plate process.
12. Film Roll Holder for Camera used about 1875.
13. John Stock Double Swing-back and sliding and revolving front Camera, 1859.
14. Rolling Slide Camera with crank focusing screw, used about 1860.
15. Panoramic Camera, invented in 1865, by J. R. Johnson.
16. Machine for Retouching Negatives, invented 1876, by F. Mauravour.

Development of the Hand Camera.

This group shows the earliest forms of the hand camera, and also the latest improvements in that instrument, but on account of the limited space it has been necessary to leave out some of the intermediate forms.

Beginning at the lower left-hand corner we show the portable Daguerreotype Camera as used about 1850. It will be seen that this camera is provided with a focusing hood, although this is generally supposed to be a much more recent invention.

Next on the right is one of the early detective cameras which might seem rather difficult to keep out of sight. Next on the right again is the first kodak, and on the left on the shelf above is one of the early Scoville hand cameras, and on the top shelf on the right is the latest improved kodak.

17. Portable Daguerreotype Camera, used about 1851.
18. So-called Detective Camera, 1880.
19. First Kodak made by the Eastman Co., 1880.
20. Hand Camera made by the Scoville Co. in 1890.
21. Field-glass Camera.
22. Kodak made by the Eastman Co., 1892.
23. Folding Kodak made by the Eastman Co., 1890.
24. Kodak for 100 Exposures made by the Eastman Co., 1888.
25. Genie Magazine Camera made by the Genie Co., 1890.
26. Kodak for 4 by 5 Films, about 1891.
27. Panoram Kodak made by Eastman Co., 1894.
28. Eastman Pocket Kodak, 1895.
29. Eastman 3A Kodak, 1903.
30. Speed Kodak No. 4A, 1908, by Eastman Co.

HISTORY OF MEDICINE IN AMERICA.

The medical exhibit arranged by Dr. James M. Flint, of the National Museum, consists mainly of photographs of noted doctors, from the physician who accompanied Captain John Smith to America through Dr. Crawford W. Long, who, it is said, first used ether as an anæsthetic in surgical operation, through Dr. Zabdiel Boylston, the first in America to perform inoculation for smallpox, and many others, to Dr. Carlos Finlay, who is given the honor of first formulating a definite theory as to the transmission of yellow fever by the mosquito. An item of interest in the history of medicine is in connection with Captain Smith himself, who is characterzed as "the first patient on record as having received medical aid in the colony of Jamestown."

In connection with the discovery of America, it may be noted that accompanying Columbus on his first voyage of discovery were two physicians

("fisicas"), Maestro Alonzo, of the *Santa Maria,* and Maestro Juan, of the *Pinta.* On the return of Columbus to Spain, Maestro Juan remained, with thirty-seven other men, at La Navidad, San Domingo. All were killed by the Indians before the arrival of the second expedition. The chief physician to the fleet of Columbus on his second voyage was Dr. Diego Alvarez Chanca; native of Seville, physician-in-ordinary to the King and Queen of Castile and Aragon. His professional services were much in demand, as the personnel of the fleet suffered greatly from malarial fever and other diseases. A letter of his, addressed to the Municipal Council of Seville, is said to be the "first written document on the natural history, ethnography, and ethnology of America." [See Smithsonian Miscellaneous Collections, vol. 48, p. 428.]

American Indian Medicine.—Indian medicine is principally "Magic Medicine." Disease is believed to be due to the agency of evil spirits, especially the revengeful spirits of slain animals, and to witchcraft. The "medicine man," in the exercise of the function of physician, strives to exorcise the malignant spirits by means of intimidation or cajolery, or through the intercession of friendly spirits more powerful than the disease spirit.

Drugs are used by the "medicine man" only as adjuncts to the ceremonies of exorcism. They are probably regarded as fetiches; that is, the material form or dwelling-place of spirits capable of assisting in expelling the disease.

Besides this purely magic medicine, a sort of "domestic" or empirical medicine is practiced, in which drugs are the principal agents. But even in this method of treatment the selection of the remedy is more often determined by some imaginary relation between the physical qualities of the drug and the symptoms of the disease than by proof of its efficacy, and in the gathering and preparation of the medicines magic rites are observed.

The knowledge possessed by the Indians concerning plants and their therapeutic uses is superficial, and the popular impression regarding the medical skill of the Indian doctor is erroneous.

The vapor bath, followed by a cold plunge or douche, is a favorite remedy for disease, as well as an established ceremonial on various occasions.

Surgery is almost an unknown art among the Indians. Some dexterity is shown in the treatment of fractures and superficial wounds, and such minor operations as scarification, venesection, and actual cautery are practiced by some tribes.

Sioux Medicine Man.—Picture of the costume worn by the "Medicine Man" or "Priest-Doctor" while exorcising the evil spirits of disease. Clad in the skin and mask of a bear, with pendants of various small animals, he carries in one hand a drum and in the other a spear with a carved and decorated shaft. 143,117.

Indian Medicine Man Preparing Medicine.—He is represented seated upon a mat inside a rude tent, holding between his feet a vessel, the contents of which he is stirring with his right hand; with his left hand he shakes a rattle, meantime reciting certain incantations whereby he potentizes his drugs.

From Schoolcraft's History, Condition, and Prospects of the Indian Tribes of the United States. 143,164.

Indian Doctor Administering to a Patient.—The doctor is represented seated by the side of the sick man, shaking a rattle, and invoking the assistance of friendly spirits to drive out the malicious spirits who are causing the sickness.

A bowl of medicine is at hand which the doctor usually sprinkles or blows upon the patient in the intervals of the invocations.

From Schoolcraft's History, Condition, and Prospects of the Indian Tribes of the United States. 14,165.

Medicine Bowl.—Used by the Priest-Doctor of the Zuni Indians for preparing and holding medicine.

James Stevenson. 111,421.

Raven Rattle.—A hollow wooden figure, carved in imitation of a raven, bearing upon its back a recumbent human figure representing a sick man, from whose mouth another raven is drawing out the materialized spirit of disease. The cavity of the bird contains numerous small pebbles.

Used by the medicine men in Alaska while preparing medicine, and in the ceremony of exorcism.

Dr. A. H. Hoff. 9,256.

For Intermittent Fever.—This disease is believed to be caused by the colonization of malicious insects or worms under the skin. The bark of the Wild Cherry, *Prunus serotina* Ehrh., is infused in water into which seven coals of fire have been put. The patient is placed with his head toward the rising sun; the doctor, standing in front with the medicine cup in hand, invokes in succession the spirits of the air, of the mountain, of the forest, and of the water; after each invocation he takes some of the liquid in his mouth and blows it on the head, the right shoulder, the left shoulder, and the breast of the patient. The ceremony may be repeated each day for four days.

See Sacred Formulas of the Cherokees, by James Mooney. 143,160.

For Toothache.—Toothache is believed to be caused by a worm which has wrapped itself around the base of the tooth. The doctor invokes the red spider of the East, the blue spider of the North, the black spider of the West, and the white spider above, calling upon them to let down red threads to draw up the intruder. After warming his hands the doctor invokes the fire, meanwhile pressing his warm thumbs against the aching tooth; or he blows upon the spot from his mouth or a tube a decoction of "yellow-rooted grass."

James Mooney. 143,161.

Seventeenth Century.

Dr. Thomas Wotton.—Surgeon General of the London Company; came out with the colonists who settled in Jamestown in the year 1607. Captain John Smith calls him "Chirurgeon," and ranks him with the "Gentlemen" of the expedition. Was the pioneer doctor in the American colonies, none having accompanied the Raleigh expedition. He probably soon returned to England, as very little is recorded of him.

Dr. Walter Russell.—Came out with the "First Supply," in 1608. He accompanied Captain John Smith in his exploration of Chesapeake Bay and the Potomac River in June, 1608, and rendered the first medical aid on record, given to Englishmen, in the American colonies.

Captain John Smith, Va. (1580-1631).—The first patient on record as having received medical aid in the Colony of Jamestown. While on his first exploring expedition in the Chesapeake, June, 1608, he speared a "stingray" with his sword. While removing the fish he was wounded in the wrist by its peculiar spine. * * * "The torment was instantly so extreme, that in foure

houres had so swollen his hand, arme and shoulder, we all with much sorrow concluded his funeral, and prepared his grave in an Island by, as himselfe directed; yet it pleased God by a precious Oyle Doctor Russell at the first applied to it when he sounded it with the probe, his tormenting pain was so well assuaged that he eate of the fish to his supper."

ANTHONY BAGNALL, "CHIRURGEON."—Came to Jamestown in 1608. Accompanied Captain John Smith on his voyage of exploration from Jamestown to Nansemond, now Norfolk, in 1608. He is recorded to have cared for Captain Smith's stingray wound, which had not yet healed. He also rendered surgical aid to an Indian who had been shot in the knee during a fight with Captain Smith's party. In an action with the Indians, Dr. Bagnall's hat was pierced by an arrow.

DR. LAWRENCE BOHUN.—Arrived in Virginia in 1610. Physician-General of the Colony, 1611. When Lord Delaware was obliged to leave Virginia for his health, in March, 1611, Doctor Bohun accompanied him, and was killed during a fight with a Spanish war-ship.

THE FIRST LAW REGULATING MEDICAL PRACTICE IN THE COLONIES.—A copy of an Act of the Grand Assembly of Virginia, dated March, 1645-6, in slight amendment of an Act of Assembly held October 21, 1639.

Chirurgeon, Midwives, Physitians. Forasmuch as the Law of God allowes no man to impaire the Life, or Limb of any person, but in a judicial way:

It is therefore Ordered, That no person or persons whatsoever, imployed at any time about the bodyes of men, women or children, for preservation of life or health; as Chirurgeons, Midwives, Physitians or others, presume to exercise or put forth any act contrary to the approved Rules of Art, in each Mystery and occupation, or exercise any force, violence or cruelty upon or toward the body of any, whether young or old (no not in the most difficult and desperate cases) without the advice and consent of such as are skillfull in the same Art (if such may be had) or at least of some of the wisest and gravest then present, and consent of the patient or patients if they be *mentes compotes,* much less contrary to such advice and consent; upon such severe punishment as the nature of the fact may deserve, which Law nevertheless, is not intended to discourage any from all lawfull use of their skill, but rather to incourage them and direct them in the right use thereof, and inhibit and restraine the presumptuous arrogancy of such as through presidence of their own skill, or any other sinister respects, dare boldly attempt to exercise any violence upon or towards the bodyes of young or old, one or other, to the prejudice or hazard of the life or limbe of man, woman or child.

DR. SAMUEL FULLER, MASS. (— 1632).—The first physician to the Plymouth Colony; came over in the *Mayflower,* 1620. He was "Deacon" in the church, and is said to have met with great success in his practice, being called in consultation, in after years, even to Charlestown and Salem. A slight clew to the medical methods of the day may be found in letter to Governor Bradford, dated June 28, 1630, in which Doctor Fuller says: "I have been to Matapan" (now Dorchester) "and let some twenty of these people blood."

DR. JOHN CLARK, MASS. (1598-1664).—Arrived in Boston about 1650. Said to have received a diploma in England for his success in cutting for stone. His portrait is introduced to illustrate the dress and appearance of a physician of that period.

Law Regulating Medical Practice.—From "The General Laws and Liberties of the Massachusetts Colony, 1649." It also appeared nearly verbatim in "The Duke of York's Laws" for the Colony of New York, promulgated in the year 1665:

Whereas by the 9th Act of Assembly held the 21st of October, 1639, consideration being had and taken of the immoderate and excessive rates and prices exacted by practitioners of physic and chirurgery and the complaints made to the then Assembly of the bad consequences thereof, It so happening that the hearts of divers master were hardened rather to suffer their servants to perish for want of fitt meanes and applications than by seeking releife to fall into the hands of griping and avaricious men, It be apprehended by such masters who were swayed by politick respects than by Xpian [Christian] duty or charity, That it was the more gainful and saving way to stand the hazard of their servants than to entertain the certain charge of a physitian or chirurgeon whose demands for the most parte exceede the purchase of the patient. It was therefore enacted for the better redress of the like abuses thereafter until some fitter course should be advised on within the Colony, That it should be lawfull and free for any person or persons in such cases where they should conceive the acco'nt of the physitian or chirurgeon to be unreasonable either for his pains or for his druggs or medicines, to arrest the said physitian or chirurgeon either to the quarter court where they inhabitt, where the said physitian should declare upon oath the true value, worth and quantity of his druggs and medicines administered to or for the use of the plt [plaintif] whereupon the court where the matter was tried was to adjudge and allow to the said physitian or chirurgeon such satisfaction and reward as they in their discretions should think fit. And it was further ordered that when it should be sufficiently proved in any of said courts that a physitian or chirurgeon had neglected his patient, or that he had refused, being thereunto required, his helpe and assistance to any person or persons in sickness or extremity, that the said physitian or chirurgeon should be censured by the said court for such neglect or refusal. Which said act and every clause therein mentioned and repeated this present Grand Assembly to all intents and purposes doth revive, ratifie, allow and confirm with this only exception that the plts, or patients, shall have their remedie at the County Courts respectfully, unless in case of appeale.

The First American Medical Publication, 1677.—"A Brief Rule to guide the Common People of New England how to order themselves and theirs in the Small Pocks or Measles." By Thomas Thacher, eminent divine, learned physician; first minister of the Old South Church, Boston.

Extracts.—From a manuscript of "Receipts to cure various Disorders," sent by Dr. Edward Stafford, of London, to Governor Winthrop, of Massachusetts, in the year 1643.

"8. For the yellow jaundise or jaunders—Boyle a quart of sweet milke, dissolve therein as much bay-salt, or fine Salt-peter, as shall make it brackish in taste; and putting saffron in a fine linen clout, rubb it into ye Milke until ye milke be very yellow; and give it ye patient to drinke."

"9. For paines in ye breast or limmes, weare a wilde catts skin on the place grieved."

"10. For a broken bone, or a joynt dislocated, to knit them: Take ye bark of elme, or witch-hazzle; cutt away the outward part, and cutt ye inward redd

barke small, and boyle it in water till it be thick that it will rope; pound well, and lay of it hott, barke and all upon ye bone or joynt, and tye it on; or with the Mussilage of it, and bole Armoniak make a playster and lay it on."

"17. For the King's evill. Take 2 Toades and let them fast 2 or 3 dayes that they may spewe out their Earth, then boyle them in a pint of oyle in a newe pipkin covered so long, till they be brought to a black Coale broken in pieces—presse out the Oyle from the said Toades, reserve a 4th part, to the other thsee parts add halfe a pound of yellow wax, shaved small—let the wax melt in the Oyle in wch. dippe the linnen cloathes, that they may be well covered cere-cloathes—with the 4th part of the Oyle left annoynt all the places infected, and then strew of my black powder of Toades (mentioned before for an Antidote agaynst the Plague) upon the sores or swellings, and then put on of ye Cere-cloath. By this course there is no doubt of the Cure by God's assistance."

Dr. Thomas Wynne, Penn. (— 1691).—Came over with William Penn in 1682. His brother, also a physician, is said to have come with him. Thomas Wynne entered public life and became Speaker of the first Provincial Assembly of Pennsylvania.

Dr. Griffith Owen, Penn. (1647-1717).—Came over with William Penn, in the *Welcome,* in 1682.

Said to have been "very knowing and eminent" in his practice as a physician. Performed the first known amputation in Pennsylvania.

The Village Doctor.—Photograph of a painting by Jan Steen. It illustrates the costume of the Dutch doctor of the early Colonial period.

The Family Physician.—Photograph from a painting by the Dutch painter, Jan Steen (1626-1679), to illustrate the costume and general appearance of the Dutch doctor of the early Colonial period.

It is presented in lieu of the portraits of the primitive physicians to the Dutch Colony of New Amsterdam (New York), among whom were:

Dr. Mynderts van de Bogaerdet, Ship Surgeon, arrived 1631. First physician to the Dutch Colony.

Dr. Johannes La Montagne, "Huguenot and Gentleman," arrived in 1637. Was sent with fifty men to defend Fort New Hope, now New London, against an attack by the Massachusets colonists.

Dr. Hans Kierstede, "Surgeon," arrived 1638. Had an extensive practice and served the company "long and faithfully." He prepared a famous unguent, sold under his name until a very recent day.

Dr. Poulus van der Beeck, the first physician practicing in Brooklyn.

Rev. Cotton Mather (1663-1728).—At whose instigation the first inoculation was performed in America.

Noted as a preacher, pastor, philanthropist, and author. At the risk of his life, in the face of violent popular opposition, he advocated and vindicated the introducton of inoculation as a protection against the terrible ravages of the smallpox.

He was led to the advocacy of this measure by the reading of a paper by Dr. Emmanuel Timonius, then residing in Constantinople, on "Turkish Inoculation," which paper was published in the Philosophical Transactions of London, in the year 1717.

Dr. Zabdiel Boylston, Mass. (1684-1766).—The first in America to perform the operation of inoculation for smallpox.

A resident of Brookline, Mass., of high repute in his profession. At the solicitation of Rev. Cotton Mather, after the refusal of the physicians of Boston to make the experiment, on June 27, 1721, Doctor Boylston inoculated his thirteen-year-old son and two colored servants with smallpox virus. This was about six weeks after the first inoculation in England, and, of course, without knowledge of that operation. He was viciously assailed by physicians, clergymen, and the general public, but at the peril of his life he continued the practice until its benefits were acknowledged.

Extract.—From a paper by Dr. Emmanuel Timonius, a resident of Constantinople, on "Turkish Inoculation," published in the Philosophical Transactions, London, 1717, 5, chap. 6, p. 370. The reading of this paper led Rev. Cotton Mather to advocate this method for the mitigation of the ravages of smallpox, then fatally prevalent in the New England Colonies.

The history of the Inoculation of the smallpox. Extracted from a letter of Dr. E. Timonius:

"The writer of this Discourse observes that the Circassians, Georgians, and other Asiatics, have introduced this practice of procuring the Small-Pox by a sort of Inoculation for about the space of forty years, among the Turks and others at Constantinople.

"This method of the operation is thus—Choice being made of a proper contagion, the Matter of the Pustules is to be communicated to the person proposed to take the infection. For this purpose they make choice of some boy, or young lad, of a sound healthy temperament, that is seized with the common small-pox.

"On the 12th or 13th day from the beginning of his sickness, they with needle prick the tubercules (chiefly those on the shins and hams) and press out the matter coming from them into some convenient vessel of glass. * * * The patient being in a warm chamber, the Operator is to make several little wounds with a needle in one, two or more places of the skin, till some drops of blood follow, and immediately drop out some drops of the matter in the glass, and mix it well with the Blood issuing out; one drop of Matter is sufficient for each place pricked."

Dr. James Lloyd, Mass. (1728-1810).—Noted surgeon; a pioneer in the practice of obstetrics in this country.

Born on Long Island, N. Y.; educated in Stratford and in New Haven, Conn.; studied medicine with Doctor Clarke, in Boston; two years at lectures in London

"Believed to be the first to perform lithotomy in Boston, if not in New England;" and the first in the country to substitute ligatures for the actual cautery, for control of hemorrhage in surgical operations. "Commanded a more respectable circle of professional business than any other physician of his day."

Dr. Cadwallader Colden, N. Y. (1688-1776).—Eminent physician, author, and statesman.

Born in Scotland; emigrated to Philadelphia in 1710; removed to New York in 1718. One of the early writers of note on medical and other topics. Soon relinquished practice and devoted himself to scientific and literary pursuits, and politics. Became Surgeon-General, Master in Chancery, Member

of the Council, and Lieutenant Governor of New York. Author of "Account of Climate and Diseases of N. Y.;" account of the "Throat Distemper" (Diphtheria) which prevailed in New Hampshire in 1735, and spread through the colonies, and "History of the Five Indian Nations."

THOMAS CADWALLADER, PENN. (1707-1779).—Gave the first series of practical demonstrations of anatomy to a number of physicians in 1750. Author of one of the first publications on medical subjects, in the year 1740, on the "Iliac Passion" (Intestinal obstruction). First Vice-President of the American Philosophical Society, 1769; director of military hospitals in the War of the Revolution; one of the founders of Pennsylvania Hospital; one of the original trustees of the Medical College of Philadelphia, 1765.

Of his family, besides himself, two sons, three sons-in-law, and seven nephews took prominent part in the Revolution, both in civil and military affairs.

EIGHTEENTH CENTURY.

DR. JOHN LINING, S. C. (1708-1760).—Wrote the first American account of Yellow Fever.

Eminent physician and philosopher, native of Scotland. He advanced and supported vigorously the theory of immunity after one attack of yellow fever. Perhaps the earliest American physiologist. Made an elaborate series of experiments upon himself on the process of metabolism; published in the Transactions of the Royal Society, 1743.

THE EASTERN STATE HOSPITAL OF VIRGINIA.—The original "Hospital Building for Idiots, Lunatics, and Persons of Insane and Disordered Minds."

Erected in the city of Williamsburg, Va., in accordance with an act passed by the House of Burgesses in November, 1769. Building completed in 1773. The first hospital erected in this country exclusively for the insane.

EASTERN STATE HOSPITAL OF VIRGINIA.—Engraving representing the "Montague Building," erected in 1902, the latest of several buildings forming the present group of structures known as the Eastern State Hospital of Virginia.

DR. WILLIAM BULL, S. C. (1709-1791).—Said to have been the first white person born in South Carolina, and the first native to obtain a degree in medicine (Leyden, 1734). Called the "learned Dr. Bull." He was a member of the Council, Speaker of the House of Representatives, and Lieutenant-Governor for many years. He was a "Tory" and left the country in 1782.

DR. JOHN MOULTRIE, S. C. (——, 1773).—Especially distinguished for his skill in obstetrics. Born in Scotland; came to Charleston, S. C., in 1733; at the head of his profession in that city for nearly forty years. "His death was regarded as a public calamity; several of the ladies of Charleston bedewed his grave with tears and went into mourning on the occasion."

DR. LIONEL CHAMBERS, S. C. (1715-1777).—Eminent physician, distingished for his original researches and writings. Native of Scotland; graduate of Edinburgh; emigrated to South Carolina about 1745; published an "Account of the Weather and Diseases of South Carolina," an "Essay on Fevers," and other works of note.

DR. ALEXANDER GARDEN, S. C. (1730-1792).—Successful practitioner; noted botanist. Native of Scotland; emigrated to South Carolina about 1750. One of four colonial physicians to receive the honor of Fellowship of the Royal

Society of London, viz.: Zabdiel Boylston, Mass.; John Mitchell, Va.; Alexander Garden, S. C.; John Morgan, Penn. Discovered the anthelmintic properties of pinkroot (spigelia). The shrub *Gardenia* was so named by Linnæus in honor of Dr. Garden.

Dr. Thomas Bond, Penn. (1712-1773).—Originator of the movement for the establishment of Pennsylvania Hospital. Native of Maryland. Studied medicine for six years with Doctor Hamilton, of Maryland; pursued his studies in Europe; settled in Philadelphia in 1734. Benjamin Franklin writes of him: "Dr. Thomas Bond, a particular friend of mine, conceived the idea of establishing a hospital in Philadelphia (a very beneficent design, which has been ascribed to me, but was originally and truly his) for the reception and cure of poor sick persons."

Pennsylvania Hospital.—The first general hospital established in the colonies. Originated in the efforts of Dr. Thomas Bond, supplemented by the skillful promotion of Benjamin Franklin; established through the generosity of the people of Philadelphia and the House of Representatives of the Province. Chartered May, 1751; first patient received in temporary hospital February 10, 1752; cornerstone of permanent building laid May 28, 1755. Occupied by patients December 17, 1756.

Benjamin Franklin, Penn. (1706-1790).—The most active promoter of the plan of Doctor Bond for the establishment of Pennsylvania Hospital. Born in Boston; printer, writer, patriot, diplomat; signer of the Declaration of Independence; twice envoy to England, once to France. By his skillful leading of public sentiment and of legislative action, he succeeded in raising the necessary funds for the building of the hospital.

Minute Book of Pennsylvania Hospital.—A page from the proceedings of the first meeting of contributors for the election of managers. In the handwriting of Benjamin Franklin.

Blacksmith's Bill.—For chains for lunatics, etc. Indicates the method in use for the restraint of lunatics.

Cornerstone of Pennsylvania Hospital.—As it appeared in 1794. The inscription, written by Franklin, reads as follows:

In the year of Christ
MDCCLV
George the second happily reigning
(For he sought the happiness of his people)
Philadelphia flourishing
(For its inhabitants were publick spirited)
This building
By the bounty of the Government,
and of many private persons,
was piously founded
For the relief of the sick and miserable;
May the God of Mercies
Bless the undertaking.

Pennsylvania Hospital.—Front view of the present Hospital Building.

Seal of Pennsylvania Hospital.—The device represents the Good Samaritan taking charge of the sick man, and delivering him to the inn-keeper, with the inscription beneath: "Take care of him and I will repay thee."

Dr. Benjamin Rush, Mass. (1745-1813).—"The greatest figure in American Medical Annals." Eminent as a physician, author, teacher, and patriot. "He established more principles, and added more facts to the science of medicine, than all who had preceded him" in America. Born near Philadelphia; academy education at Nottingham, Md.; graduate of Princeton College at the age of 15; pupil of Doctor Redman of Philadelphia for six years. Medical degree from Edinburgh in 1768; commenced practice in Philadelphia in 1769; professor of chemistry same year. Member of the Continental Congress; signer of the Declaration of Independence; Surgeon General of the Army for the Middle Department, 1776.

Christ Healing the Sick in the Temple.—A painting by Benjamin West, historical painter to His Majesty George III, and President of the Royal Society of Arts. Presented to Pennsylvania Hospital by the artist in 1817. Now on deposit with the Historical Society of Pennsylvania, 13th and Locust streets, Philadelphia.

Dr. Abraham Chovet, Philadelphia (1704- ——).—"One of the most picturesque of the physicians and teachers in the early history of medicine in Philadelphia." Born and educated in England; appointed, 1735, demonstrator of anatomy in the United Company of Barbers and Surgeons. Lived for several years in Jamaica, and afterwards removed to Philadelphia, where he became noted as a physician, as well as for his wit and eccentricities. In the winter of 1774-'5 he delivered a course of lectures on anatomy, illustrated by a collection of wax models and injected and dried anatomical preparations.

John Morgan, Penn. (1736-1787).—The prime mover in the establishment of the Medical School of the College of Philadelphia—the first on this continent. Graduate of College of Philadelphia, 1757; studied medicine with Doctor Redman, M. D., Edinburgh, 1763; studied under eminent teachers in England, France, Holland, and Italy; returned to Philadelphia in 1765. He was first to restrict himself to the practice of medicine as distinct from surgery and pharmacy. Appointed to the first medical professorship, May 3, 1765. An ardent patriot; in active service during the War of the Revolution.

"The Academy."—Occupied, 1765-1802, by the first Medical School on this continent. Situated on the west side of Fourth Street, near the corner of Mulberry Street, Philadelphia. The Medical School of the College of Philadelphia was founded through the efforts of Dr. John Morgan and Dr. William Shippen, in 1765, with Dr. Morgan as Professor of Theory and Practice of Physic; Dr. Shippen, Professor of Anatomy and Surgery; Dr. Adam Kuhn, Professor of Botany and Materia Medica, and Dr. Benjamin Rush, Professor of Chemistry. In the year 1791 it was merged with the Medical Department of the University of Pennsylvania under the name of the latter. From its foundation to the present day it has been one of the most noted schools in the country.

William Shippen, Jr., Penn. (1736-1808).—One of the founders of the Medical School of Philadelphia, and its first Professor of Anatomy and Surgery. Graduate of the College of New Jersey, 1754; studied medicine under his father; M. D. from Edinburgh, 1761; settled in Philadelphia, 1762. Delivered the first course of lectures on Anatomy given in this country, in rooms constructed in the rear of his father's house. These private lectures continued until the opening of the Medical School. Fellow of the Royal

College of Physicians of Edinburgh, 1768; Director General of Hospitals, Continental Army, 1777-1781.

Dr. Samuel Bard, N. Y. (1742-1821).—Next to Benjamin Rush, the most eminent American physician of his time. One of the most active of the founders of the first medical school and hospital in New York. Born in Philadelphia; graduate of King's College, N. Y., in 1761; medical degree from Edinburgh, 1765; commenced practice with his father in New York. First professor theory and practice of physics in King's College Medical School, 1768; visiting physician to New York Hospital; president of the faculty of the College of Physicians and Surgeons, N. Y.; one of the founders and physicians to the City Dispensary.

Dr. Peter Middleton, N. Y. (—— 1781).—One of the founders of King's College Medical School, and its first professor of physiology and pathology. Native of Scotland; came to New York about the middle of the eighteenth century. He was "distinguished for various and profound learning and great professional talent." Doctors Bard, Jones, and Middleton were reckoned the three most eminent medical men of their time in New York. Doctors Bard and Middleton were the first on record in America to inject the blood-vessels and dissect the human body.

Dr. John Jones, N. Y. (1729-1791).—First professor of surgery in the medical school of King's College. Surgeon to Colonial troops in the French and Indian War. Born in Jamaica, N. Y.; student with Doctor Cadwallader; medical degree from University of Rheims, France; settled in New York; first in that city to perform lithotomy. Present at the battle of Lake George, 1755, and had the professional care of the wounded French commander, General Dieskau.

The Old New York Hospital.—The second General Hospital to be founded in the Colonies of North America. Organized through the influence of Drs. Samuel Bard, Peter Middleton, and John Jones; chartered in 1771. The original building was destroyed by fire before completion; the reconstructed building at first used as barracks for Continental troops. Occupied for hospital purposes by the Society in January, 1791.

George Washington in his last illness, attended by Drs. Craik and Brown. Photographic reproduction from an old engraving in the possession of the Corcoran Gallery of Art.

Dr. James Craik, Va. (1731-1814).—The intimate friend and family physician of General Washington. Took part in the French and Indian War, in the campaigns of Washington and Braddock, 1754-'55. Served through the War of the Revolution, and was Director General of the hospitals at Yorktown at the time of the surrender of Cornwallis. In 1778, when war with France was threatened, Washington appointed him Chief of the Medical Department of the Army. Attended General Washington in his last illness.

Eighteenth Century—Revolutionary Period.

Dr. John Warren, Mass. (1753-1815).—One of the most eminent surgeons of his time in New England. Surgeon to the Salem Company at the battle of Lexington. Director General of the first hospital of the Continental Army. Born in Roxbury, Mass.; studied medicine with his brother, Gen. Joseph Warren; accompanied the army to New York and New Jersey, in 1776;

present at the battles of Trenton and Princeton. Professor of anatomy and surgery in the Medical School of Cambridge, organized through his influence. President of the Massachusetts Medical Society from 1804 until his death.

Dr. John Jeffries, Mass. (1744-1819).—Believed to have been the first native of the American provinces to obtain the degree of Doctor of Physic (Aberdeen, 1769). Assistant Surgeon H. B. M. ship *Captain,* 1771-1774. Professionally engaged by the commander of the British squadron at the beginning of the Revolution; identified to General Howe the body of General Warren on the field of Bunker Hill. Surgeon General of the British forces in Nova Scotia, 1776-1779. Surgeon Major to the forces in America, 1779-1780. Successful practitioner in London. Made the first successful balloon voyage across the English Channel. Returned to Boston, 1790, where he remained until his death. Believed to have given the first lecture on practical anatomy in Boston; mobbed the next day.

Dr. Ezra Green, Mass. (1746- ——).—Surgeon of the Continental sloop-of-war *Ranger,* commanded by Capt. John Paul Jones. Graduate of Harvard, 1765; studied medicine at Malden and Newburyport; practiced in Dover, N. H. Commissioned surgeon of the *Ranger* in 1797. Was in the fight between the *Ranger* and the *Blake.*

A Certificate of Fumigation.—Issued by the Selectmen of Boston, dated August 6, 1776. This certificate states that one Mr. Browne has been "smoaked and cleansed," and is permitted to pass into the country without danger of communicating the smallpox. (Signed) John Scollay, Jno. Pitts, Selectmen of Boston.

Letter of Recommendation from Dr. John Morgan, Surgeon General of the Continental Army. The letter certifies, in effect, that Mr. Solomon Browne has served in the General Hospital acceptably and faithfully, and is recommended to the public as a "young gentleman of assiduity and merit." Photographed from the original in the possession of Mr. Henry Russell Browne, of New York.

Dr. William Eustis, Mass. (1753-1825).—Military surgeon throughout the War of the Revolution; member of Congress; Secretary of War in the cabinet of President Madison. Born in Boston, Mass.; graduate of Harvard College, 1772; studied medicine with Dr. Joseph Warren; followed the latter to Lexington and gave aid to the wounded of that day. Surgeon of the Massachusetts Artillery Regiment; in charge of the military hospital on the Hudson river opposite West Point.

Doctors of Medicine Who Signed the Declaration of Independence.

Dr. Josiah Bartlett, N. H. (1729-1795).—A signer of the Declaration of Independence. Born in Massachusetts; began the study of medicine at the age of sixteen; commenced practice at Kingston, N. H., in 1750; became celebrated for his success in the treatment of "throat distemper," by tonic and supporting measures, during the epidemic of 1754; delegate to the Continental Congress; first after the President to sign the Declaration; Colonel in the Army; justice of the Superior Court; member of the Convention for framing the Constitution in 1787; first Governor of New Hampshire, 1793.

Dr. Matthew Thornton, N. H. (1714-1803).—A signer of the Declaration of Independence. Native of Scotland; educated in Connecticut; began prac-

tice in Londonderry, N. H., "where he became conspicuous for professional skill;" colonel of militia under the Royal Government; member of the Provincial Congress, 1775; delegate to the Continental Congress, 1776; Chief Justice of the Court of Common Pleas and Judge of the Superior Court of New Hampshire; senator in the State Legislature, and member of the Council.

Dr. Oliver Wolcott, Conn. (1726-1797).—Captain of volunteers in the French War, 1748; Brigadier General of Militia, 1776; Major General of Militia, 1779; commanded a brigade at the battle of Saratoga. Born in Connecticut; graduate of Yale; student of medicine with his brother, but did not engage in practice.

Dr. Lyman Hall, Ga. (1731-1790).—A signer of the Declaration of Independence. Born in Connecticut; graduate of Yale; successful practitioner of medicine in Sudbury, Ga.; one of the foremost of the citizens of his State in securing the coöperation of Georgia with the other colonies; member of the Provincial Congress of Georgia in 1774 and 1775; delegate to the Continental Congress in 1775; signer of the Declaration; Governor of his State in 1773.

Dr. Benjamin Rush, Pa. (1745-1813).—A signer of the Declaration of Independence. Preëminent in his profession, a voluminous writer, an ardent patriot, taking an early and active part in the movement for independence; member of the Continental Congress of 1776; signer of the Declaration; member of the Convention for the formation of the Constitution, 1787; Treasurer of the U. S. Mint, 1799.

Director Generals and Chief Physicians to the Continental Army in the War of the Revolution.

Dr. Benjamin Church, Mass. (1734-1776).—The first Director General of Hospitals, and Chief Physician of the Continental Army. Elected by Congress July 27, 1775. A successful physician and surgeon, a brilliant writer, an ardent and influential patriot. Represented Massachusetts Province in the Continental Congress of 1775; selected by the Provincial Congress to receive and welcome General Washington at Cambridge. He was accused of "holding criminal correspondence with the enemy," tried by court-martial October, 1775, convicted, dismissed from the service, and imprisoned.

Dr. John Morgan, Penn. (1735-1789).—Appointed by the Continental Congress "Director General of Hospitals, and Physician-in-chief to the American Army," October 17, 1775. He immediately joined General Washington in Cambridge, and continued in office until January 9, 1777. "By reason of unjust clamors he was dismissed from service. A committee of Congress afterwards investigated his case, and honorably acquitted him of all charges."

Dr. William Shippen, Jr. (1736-1808).—Unanimously elected by Congress "Director General of all the Military Hospitals for the Armies of the United States," April 11, 1777. In consequence of charges brought against him of maladministration of his office, he resigned his post June 3, 1781. "The investigation did not develop any matter reflecting on his integrity."

"The Razor Letter."—From Director General John Morgan to Surgeon General John Warren, at the Long Island Hospital, illustrating the difficulty under which the surgeons of the Continental Army labored. Written four days before the battle of Long Island.

"Sir: I have sent to the surgeons, desiring the youngest off duty to go to your assistance and take four mates with him; to carry over 500 additional bandages and twelve fracture-boxes. I fear they have no scalpels, as whatever I have committed to the hospitals has always been lost. I send you two, in which case, if you want more, use a razor for an incision knife. Let me know from time to time at Long Island.

"John Morgan."

Dr. John Cockran, N. J. (1730-1807).—Surgeon General of the Middle Department in 1777. Director General of Hospitals and Chief Physician of the Continental Army (1781 ——?). Born in Pennsylvania; studied medicine with Doctor Thompson, of Lancaster. Served as Surgeon's Mate in the French War. Eminently distinguished as a practitioner of medicine and surgery.

Some Doctors Who Held Military Command in the Revolution.

Dr. Josiah Bartlett, N. H. (1729 ——).—Lieutenant Colonel of Militia under the King, 1767-1775; deprived of his commission because of his zeal in the cause of the Colonies; reappointed Colonel of Militia by the Provincial Congress, 1775; organized regiments to resist impending attack from Montreal, 1777; accompanied General Stark to Bennington, in charge of supplies for the New Hampshire troops. Born in Amesbury, Mass.; studied medicine with Dr. Ordway; practiced in his native town, where he gained great repute; was an ardent patriot, and left medicine for politics at the outbreak of the Revolution.

Dr. John Beatty, N. J. (1749-1826).—Colonel in the Pennsylvania Line; made prisoner at Fort Washington, and held for several years; Commissary General of Prisoners, 1778-1780. Born in Pennsylvania; graduated at Princeton, 1769; studied medicine with Dr. Rush; practiced medicine until the Revolution; delegate to the Congress of the Confederation, 1783-'85; member of the National Congress, 1793-'95.

Dr. Theodoric Bland, Va. (1742-1790).—Captain of the First Troop of Virginia Cavalry; Lieutenant Colonel and Colonel of the regiment; distinguished himself at the battle of Brandywine; in command of the troops in Albemarle Barracks, Va., 1779. Born in Prince George County, Va.; educated in England; graduated in medicine from Edinburgh; returned to America in 1764, and practiced medicine in his native State until the Revolution.

Dr. James Brickett, Mass. (1737-1818).—Brigadier General in the expedition designed for Canada, 1776; commanded the American escort of Burgoyne's surrendered army from the Saratoga battlefield to Cambridge, Mass., 1777. Was a physician in Haverhill, Mass., until the French War; Surgeon in the Army at Ticonderoga; wounded at the Battle of Bunker Hill.

Dr. John Brooks, Mass. (1752-1825).—Captain of the Minute Men at Concord; Major in the Continental Army at White Plains; Colonel Eighth Massachusetts Regiment at Saratoga; acting Adjutant General at Monmouth. Born in Medford, Mass.; studied medicine with Dr. Tufts; practiced in Reading and Medford, Mass.; Fellow of Massachusetts Medical Society; member of Academy of Arts and Sciences; Governor of the Commonwealth of Massachusetts; President of the Society of Cincinnati and of the Washington Monument Association.

Dr. Timothy Childs, Mass. (1748-1821).—Captain of Minute Men in 1775; Surgeon to Colonel Patterson's Regiment on the expedition against Montreal. Born in Deerfield, Mass.; at Harvard, 1764-'67; studied medicine; began practice at Pittsfield, Mass., 1771.

Dr. David Cobb, Mass. (1748-1830).—Lieutenant Colonel of Henry Jackson's Regiment, 1777 and 1778; Colonel and Aide to General Washington for several years; promoted to rank of Brevet Brigadier General. Born in Attleboro, Mass.; graduated from Harvard, 1766; studied medicine and practiced for many years in Taunton, Mass.; after the war he was Judge of the County Court, Speaker of the Massachusetts House of Representatives, member of Congress, President of State Senate, Lieutenant Governor, and Major General of State Militia.

Dr. Henry Dearborn, N. H. (1751-1829).—Captain in Colonel Stark's Regiment at Bunker Hill; captured in the attack on Quebec; Major at Ticonderoga; Lieutenant Colonel at Monmouth; present at the surrender of Cornwallis; Major General U. S. Army, February, 1812. Born at North Hampton, N. H.; studied medicine with Dr. Jackson, of Portsmouth; practiced medicine in Portsmouth, 1771-1775; after the war, twice elected to Congress; Secretary of War for eight years under Jefferson, 1801-1809; Minister to England, 1822.

Dr. John Ely, Conn. (1737-1800).—As Captain of Militia, 1775, marched to Roxbury; Major and Colonel Commandant of Fort Trumbull, 1776; captured by the British, December, 1777, and held prisoner at Flatbush, L. I.; refused parole in order to devote himself to the care of the sick prisoners; afterward refused exchange for the same reason. Born in Lyme, Conn.; studied medicine and practiced in his native town; was particularly successful in the treatment of smallpox, and erected several hospitals near Lyme for its treatment.

Dr. John Flagg, Mass. (1743-1793).—Lieutenant Colonel of Militia under Colonel Timothy Pickering. Born in Chester, N. H.; graduated at Harvard, 1761; studied medicine in Andover; practiced at Lynn, Mass.; an early member of the Massachusetts Medical Society.

Dr. Nathaniel Freeman, Mass. (1741-1827).—Commanded a regiment of militia in the expedition to Rhode Island; Brigadier General of Militia, 1781-1793. Born in Dennis, Mass.; studied both law and medicine, and became distinguished as a physician and surgeon; practiced in the town of Sandwich, Mass.; Member of Congress, 1795-'99; Judge of Probate for 47 years.

Dr. Joseph Gardiner, Pa. (1752-1794).—Commanded the 4th Battalion of Militia from Chester county. Was a physician; member of the Committee of Safety, 1776-'87; member of the Assembly, 1776-'78; member of the Supreme Executive Council, 1779; delegate to the Continental Congress, 1784-'85.

Dr. Edward Hand, Penn. (1744-1802).—Lieutenant Colonel Continental Army, 1776; Brigadier-General, 1777; Adjutant-General on the staff of General Washington, 1781. Born in Ireland; came to America as Surgeon's Mate of the 18th Royal Irish Regiment, 1744; resigned and took up the practice of medicine in Pennsylvania; served in the Patriot Army through the war; delegate to the Continental Congress, 1784-1785.

Dr. William Irvine, Pa. (1741-1804).—Colonel of the 6th Pennsylvania Line; taken prisoner at the battle of Three Rivers, June, 1776; exchanged, 1778; Brigadier-General 2d Pennsylvania Brigade, 1779. Born in Ireland; studied medicine with the celebrated Dr. Cleghorn; surgeon in the British

Navy during the French War; came to America in 1763; commanded Pennsylvania troops in suppression of the "Whiskey Rebellion," 1794; President of the Society of the Cincinnati, of Pennsylvania; "he was distinguished for his personal bravery and as an able disciplinarian."

Dr. James McHenry, Md. (1753-1816).—Secretary on the staff of General Washington, 1778; Aide-de-camp on the staff of General Lafayette, 1780; promoted to Major, October, 1780; Secretary of War in the Cabinet of Washington, 1796. Born in Ireland; immigrated in 1771; studied medicine with Dr. Rush; Assistant Surgeon Continental Army, 1775; Surgeon of 5th Pennsylvania Battalion; taken prisoner at the capture of Fort Washington; member of Continental Congress, 1783-'84, and of the convention which formed the Constitution, 1787; Fort McHenry, in Baltimore Harbor, was named in his honor.

Dr. Hugh Mercer, Va. (1726-1777).—Captain under Braddock, 1755; desperately wounded at the battle of Monongahela, July 9, 1755; Lieutenant-Colonel, 1758; Colonel of 3d Virginia Regiment, 1776; Brigadier-General Continental Army, June, 1776; killed at the battle of Princeton, 1777. Born in Scotland; medical degree from Aberdeen University; Assistant Surgeon in the Army of Prince Charles Edward at the Battle of Culloden, 1745; came to America, 1747; practiced medicine near what is now Mercersburg, Penn.; at the close of the French War he resumed practice in Fredericksburg, Va., until the Revolution.

Dr. Nathaniel Peabody, N. H. (1741-1823).—Lieutenant-Colonel in the Royal Army, 1774; resigned his commission and joined the patriot army; engaged in the capture of Fort William and Mary at Newcastle, Del.; Adjutant-General of the State Militia, 1777; served in Rhode Island in 1779; Major-General of Militia, 1793-1798. Born in Topsfield, Mass.; studied medicine with his father; began practice in Plaistow, N. H., 1761; Delegate to Continental Congress, 1779-'80; one of the founders of the New Hampshire Medical Society, 1790.

Dr. Oliver Prescott, Mass. (1731-1804).—Major, Lieutenant-Colonel, and Colonel of Militia under the King; Brigadier-General of Militia, 1775; Major-General of Massachusetts Militia, 1778-1781. Born in Groton, Mass.; graduated from Harvard, 1750, and engaged in the active practice of medicine in his native town; a founder of the Massachusetts Medical Society; President of the Middlesex Medical Society; honorary degree of Doctor of Medicine from Harvard University.

Dr. Arthur St. Clair, Pa. (1734-1818).—Ensign in Royal American Foot Regiment, 1757; Lieutenant, 1759; took part in the attack on Quebec and siege of Montreal, 1760; Colonel of Pennsylvania Militia, 1775; Brigadier-General, 1776, at the battles of Trenton and Princeton; Major-General, 1777; voluntary Aide-de-Camp to General Washington at Brandywine. Born in Scotland; studied medicine with the celebrated Dr. Hunter, of London; left his medical studies for service in the army; came to America with his regiment, married in Boston, resigned his commission, and remained in this country.

Dr. Erastus Sergeant, Mass. (1742-1814).—Major of the 7th Massachusetts Regiment; served on Lake Champlain, 1776-1777, and was present at Burgoyne's surrender. Born in Stockbridge, Mass.; studied medicine with his uncle at Deerfield; after his military service resumed practice in his native region, where he was esteemed as a very skillful surgeon.

Dr. Isaac Smith, N. J. (1740-1807).—Colonel, commanding a regiment in the Continental Army. Graduated at Princeton, 1758; studied medicine and became a practicing physician; "was distinguished as an efficient officer, and was especially noted for his wisdom and sagacity;" Associate Justice of the U. S. District Court for New Jersey, 1777-1803.

Dr. John Thomas, Mass. (1725-1776).—Colonel of a Provincial Regiment at the capture of Montreal, 1760; Brigadier-General Continental Army, 1775, commanding the Brigade which captured Dorchester Heights, March 4, 1776; Major-General, March 6, 1776. Born in Marshfield, Mass.; became prominent as a physician and surgeon in Kingston, Mass.; Regimental Surgeon, 1746; Surgeon on the staff of Gen. Wm. Shirley, 1747; died of smallpox during the operations against Quebec, June, 1776.

Dr. Joseph Warren, Mass. (1741-1775).—An ardent and aggressive patriot; started Paul Revere on his historic ride to Lexington; commissioned Major-General, June 14, 1775; offered the command of the troops at Bunker Hill by Colonel Prescott and General Putnam, but declined, and fought as a volunteer in the ranks; killed near the end of the action by a bullet in his brain. Born in Roxbury, Mass.; graduated at Harvard, 1759; studied medicine; began practice in Boston, 1764; became noted for his success in the treatment of smallpox; made President of the Massachusetts Provincial Congress in 1774; also Chairman of the Committee of Safety.

Dr. James Wilkinson, Md. (1757-1825).—Captain in a New Hampshire regiment, 1776; Brigade Major, July, 1776; Lieutenant-Colonel, 1777; Brevet Brigadier-General, 1777; Brigadier-General, 1792; General-in-Chief of the Army, 1796-1798 and 1800-1812. Major-General in the campaign against Montreal, 1813-1814. Born in Maryland; educated by private tutor; studied medicine for two years, leaving his medical studies to join Washington's Army at Cambridge.

Dr. Oliver Wolcott, Conn. (1726-1797).—A signer of the Declaration of Independence. Born in Connecticut; graduate of Yale; student of medicine with his brother, Alexander Wolcott; Sheriff of Litchfield Co., 1751; Judge of Probate; member of Council of State; Commissioner of Indian Affairs; member of the Continental Congress, 1776; signer of the Declaration; Governor of the State for ten successive years.

Eighteenth Century.

Dr. James McClurg, Va. (1747-1825).—For many years the acknowledged head of his profession in Williamsburg and surrounding country. Born in the county of Elizabeth City, Va.; educated at the College of William and Mary, in Williamsburg; graduate of the University of Edinburgh; settled in Williamsburg; afterward removed to Richmond. For a long time one of the Council of State in Virginia, and was a member of the convention that formed the Constitution of the United States.

Dr. David Ramsay, S. C. (1749-1815).—The best known physician from the South. Army surgeon, statesman, historian, member of Congress, and presiding officer for one year in the absence of John Hancock. Born in Pennsylvania; graduate of Princeton College, 1765; Bachelor of Medicine, 1772, College of Philadelphia; M. D., 1780, from same college, the mandamus stating: "And the Degree of Doctor of Medicine on David Ramsay, now a

prisoner with the enemy." Settled in Charleston, S. C., in 1773, where he acquired great celebrity. Author of "History of the Revolution in South Carolina" and "History of the American Revolution."

Dr. Edward A. Holyoke, Mass. (1725-1826).—First President of the Massachusetts Medical Society, organized in 1781. Graduated at Harvard, 1746; studied medicine with Dr. Thomas Berry; practiced in Salem, Mass., for about 58 years. The portrait represents him at 100 years of age. The Medical Society of which he was the first President was not the first to be formed in the Colonies, but it remains, next to the New Jersey Society, the oldest now in existence.

Dr. Benjamin Waterhouse, Mass. (1754-1846).—The first to introduce vaccination, after the method of Doctor Jenner, into America. One of the founders of the Medical School of Harvard University, and its first Professor of Theory and Practice of Medicine. Born in Newport, R. I.; studied medicine in Newport, Edinburgh, and Leyden, graduating from the latter university. Settled in Newport; removed to Cambridge. Published in the *Columbian Sentinel,* a newspaper of Boston, March 12, 1799, an account of the "new inoculation" under the title "Something Curious in the Medical Line." June, 1800, successfully vaccinated his five-year-old son. Two months later the boy was inoculated with the virus of smallpox without effect.

Dr. Elihu Hubbard Smith, Conn. (1771-1798).—Projector, and, in conjunction with Dr. Samuel L. Mitchill and Dr. Edward Miller, the founder of the first medical periodical, "The New York Medical Repository," published in this country, 1797. Born in Litchfield, Conn.; graduate of Yale at 15 years of age; studied medicine under his father; practiced in Weathersfield; afterward in New York City. One of the physicians to the New York Hospital. A voluminous writer. Died of yellow fever, September, 1798, at the age of 27 years.

The Medical Repository.—The first medical periodical published in America. Photographic reproduction of a page of the "Repository" containing Table of Contents of Volume I, Number 1.

Massachusetts General Hospital.—Founded in the year 1811, largely through the initiatory efforts of Drs. James Jackson and John C. Warren. On the 10th of August, 1810, a circular letter was issued by Drs. Jackson and Warren asking subscriptions to a "hospital for the reception of lunatics and other sick persons." The aid of prominent citizens was secured and a corporation formed under the name of "The Massachusetts General Hospital;" a substantial building was erected, and the first patient admitted in September, 1821.

Nineteenth Century.

Massachusetts Medical College (Harvard Medical School), Mason Street, Boston.—Erected in 1815. The home of the Medical School from 1816 to 1847. The school was founded in 1782. Dr. John Warren, Professor of Anatomy and Surgery; Dr. Benjamin, Professor of Theory and Practice of Physic. First lectures held in Holden Chapel, Cambridge; removed to Marlborough street, Boston, in 1810; to North Grove street in 1847; to Boylston street in 1883; and to its present location in 1905.

Massachusetts Medical College (Harvard Medical School), North Grove Street, Boston.—Erected in 1846; occupied by the College from 1847 to 1883.

Harvard Medical School, Boylston and Exeter Streets, Boston.—Occupied by the Medical School from 1883 to 1905. During this period radical changes were made in the requirements for admission and graduation, and in the methods of instruction.

Harvard Medical School.—The new group of white marble buildings for the use of the Medical School of Harvard University, dedicated in the year 1905. These four medical school buildings symbolize the progress of medicine in America during the last century.

Dr. Nathan Smith, Vt. (1762-1828).—"The most famous physician and surgeon combined that we have produced, for his fame lies in both fields." Born in Rehoboth, Mass.; removed when an infant to the wilds of Vermont; education very limited; studied medicine with Dr. Goodhue, and practiced for a time in Concord, N. H.; graduated in medicine at Harvard in 1790, being the third to receive a degree from that department; from 1796 to 1798 attended lectures and clinics in Europe; established the Medical School of Dartmouth College in 1798, the fourth in order in this country, and for 12 years was practically the only instructor; was the first Professor of Theory and Practice in Yale Medical School; in 1821 he performed ovariotomy, not knowing that it had ever been previously undertaken.

Dr. James Jackson, Mass. (1777- ——).—One of the founders of the Massachusetts General Hospital; active in the upbuilding of the Medical School; foremost in the reorganization of the Medical Society. Born in Newburyport, Mass.; graduated from Harvard at the age of 19; studied medicine with Dr. Holyoke, of Boston; after a year in the hospitals of London, commenced practice in Boston, where he was for more than half a century the "beloved physician;" he shares with Dr. Waterhouse the honors of introducing vaccination to the notice of American physicians; wrote the remarkable book, "Letters to a Young Physician just Entering upon Practice," which was for years the *vade mecum* of every New England practitioner.

Dr. Jacob Bigelow, Mass. (1787-1879).—Eminent Physician, Botanist, Author, Teacher, and Artist. Born in Sudbury, Mass.; graduate of Harvard in 1806; student of medicine in Harvard School; medical degree from the Medical School of the College of Philadelphia; settled in Boston; Professor of Materia Medica at Harvard; editor of the first edition of the U. S. Pharmacopœia; founded Mount Auburn Cemetery, laid out the grounds, surveyed the roads, and supervised its ornamentation; published an elaborately illustrated series of volumes under the title of "American Medical Botany." His address on "Self-limited Diseases" had probably more influence on medical practice than any similar work ever published in this country.

Dr. William Beaumont, U. S. Army (1785-1853).—"The pioneer physiologist of this country, the first to make an important and enduring contribution to this science." Born in Lebanon, Conn.; left his country home at 22 years of age; taught a village school and read medicine for three years; studied medicine with Dr. Benjamin Chandler, at St. Albans, Vt.; Surgeon's Mate, 6th Regiment of Infantry, 1812; Cavalry, 1819; Post Surgeon, 1819; Surgeon, 1st Regiment, 1826; resigned, 1839; practiced in St. Louis the rest of his life. Especially noted for his "Experiments and Observations on the Gastric Juice

and the Physiology of Digestion," made upon one Alexis St. Martin, afflicted with a gastric fistula resulting from a gun-shot wound.

ALEXIS ST. MARTIN, CANADA (1798-1880).—Upon whom Dr. Beaumont made his noted experiments on the physiology of Gastric Digestion. Photograph taken at the age of 81 years, 57 years after his injury. On June 6th, 1822, young Martin was accidentally wounded by the discharge of a shot-gun, carrying away a large portion of his left side and making a direct opening into his stomach. He survived the wound, but was left with a permanent fistula of the stomach. Through this opening Dr. Beaumont was able to take samples of the stomach contents for investigation at any period of the process of digestion.

DR. DAVID HOSACK, N. Y. (1769-1835).—One of the best known, most popular, accomplished, and useful physicians in New York. First in America to tie the femoral artery for aneurism. Born in New York City; graduated in arts at Princeton; medical degree at Philadelphia; commenced practice in Alexandria, Va., but soon returned to New York, then to Edinburgh and London for two years. Again in New York, he speedily gained a successful practice. Held six professorships in the course of sixteen years. He was the friend and family physician of Alexander Hamilton, and attended the latter on the field in the fatal duel with Aaron Burr.

DR. VALENTINE MOTT, N. Y. (1785-1865).—Eminent as a physician, surgeon, and teacher. The first on record to tie the innominate artery. It was said of him that no man living or dead ever tied so many arteries. Born at Glen Cove, N. Y., of Quaker parents; studied medicine with Doctor Seaman, of New York; medical degree from Columbia Medical School in 1806. Spent two years in England and Scotland; settled in practice in New York, where his success was prompt. Professor of surgery for many years in several schools. His operation on the innominate artery made him famous on both sides of the Atlantic.

DR. LYMAN SPAULDING, N. Y. (1775-1821).—Originated a plan for the formation of a national pharmacopœia, which was submitted to the Medical Society of the County of New York in January, 1817. Born in Cornish, N. H.; graduated in arts at Harvard; studied medicine with Dr. Nathan Smith, and assisted him in instituting the medical school at Dartmouth College. Commenced practice in Portsmouth, N. H. Became professor of surgery in the College of Physicians and Surgeons of the Western District of New York. Removed to New York City in 1813. Member of convention for the preparation of a national pharmacopœia, and one of the committee on publication of the first edition, issued in the year 1820.

PHARMACOPŒIA OF THE UNITED STATES OF AMERICA.—Photographic reproduction of the title page of the first edition of the United States Pharmacopœia. Published in Boston, December 15, 1820, under the direction of a committee appointed by a General Convention of Delegates from Medical Societies and Schools, which met in Washington, D. C., January 1st, 1820.

DR. PHILIP SYNG PHYSICK (1768-1837).—Called the "Father of American Surgery." Native of Philadelphia; graduate of the University of Pennsylvania at 17; studied medicine with Professor Kuhn, of Philadelphia; at 21 went to London, where he lived in the family of the famous John Hunter. Degree of Doctor of Medicine from Edinburgh at 24; Surgeon to Pennsyl-

vania Hospital in 1794; Professor of Surgery in the Medical School of Pennsylvania University in 1805, which chair he held for thirteen years. He was a brilliant operator, an ingenious surgical mechanic, an instructive teacher, and a noted lithotomist. Performed lithotomy upon Chief Justice Marshall, removing more than a thousand small calculi from his bladder.

The House in Danville, Ky., in which Dr. Ephraim McDowell performed the first known operation of ovariotomy. The operation was in the annex marked with a cross (+). Of this initial operation the editor of the London Medico-Chirurgical Review wrote as follows: "A back settlement of America has beaten the mother country, nay, Europe itself, with all the boasted surgeons thereof, in the fearful and formidable operation of gastrotomy, with extraction of diseased ovaries. We cannot bring ourselves to credit the statement."

Dr. Ephraim McDowell, Ky. (1771-1830).—The first surgeon to perform the operation of ovariotomy for the removal of a tumor; done at Danville, Ky., in the year 1807. Born in Virginia; early removed to Danville, Ky.; studied medicine with Dr. Humphreys, of Staunton, Va., and in Edinburgh with John Bell. Commenced practice in Danville, and soon became the leading surgeon in all that region. Of his first seven cases of ovariotomy six were successful. This was thirty years before the days of ether anæthesia, and nearly sixty years before the dawn of antiseptic surgery.

Dr. Daniel Drake, Ky. (1785-1852).—Foremost physician of the West, and one of the ablest and most versatile of his time in America. Born in New Jersey; removed to Kentucky when three years of age. With only the rudiments of an education he commenced the study of medicine at 15. Diploma from Doctor Goforth, the first in Ohio, at 20; in practice at Cincinnati when 22. Became a founder of medical schools and one of the greatest educators in the West. Held eleven professorships in six different schools. In 1850 published his great work on "Diseases of the Interior Valley of North America."

Dr. Robley Dunglison, Penn. (1798-1869).—Renowned as a medical teacher and writer. Author of a "Medical Dictionary" for many years the standard authority in this country. Born in England; educated in Edinburgh, London, and Paris; a practitioner in London. Author of a treatise on "Children's Diseases," and an edition of the London Medical Repository when 26 years old. Invited, 1824, by Jefferson to the chair of anatomy, physiology, materia medica, and pharmacy in the medical school of the University of Virginia. Professor in the University of Maryland, 1833; and the Jefferson Medical School, Philadelphia, 1836-1868. Author of "System of Physiology," "Hygiene," "Therapeutics," "Practice," and "Materia Medica."

Dr. William Gibson, Md. (1788-1868).—Eminent surgeon; one of the organizers of the Medical Department of the University of Maryland. The first to tie the common iliac artery for aneurism. Born in Baltimore; educated in Annapolis and studied medicine in Philadelphia; Professor of Surgery at Baltimore and Philadelphia; brilliant teacher, bold operator, "scholar, sportsman, artist, musician, accomplished man of the world;" present at the battle of Carunna, Spain, 1809; at Lundy Lane, 1814, where he extracted a bullet from Gen. Winfield Scott, and at Bladensburg, and the repulse of the British at Baltimore; also at Waterloo, 1815, where he was slightly wounded.

Dr. George McClellan, Penn. (1796-1847).—One of the founders of the Jefferson Medical College, Philadelphia, 1826, and its first professor of surgery. Born in Woodstock, Conn.; graduated in arts at Yale; studied medicine at Pomfret, Conn., and at Philadelphia, graduating at the University of Pennsylvania, 1819. Became an eminent surgeon and "was extremely popular as a bold, dashing operator and an enthusiastic, inspiring teacher."

Dr. Samuel D. Gross, Pa. (1805-1884).—Eminent as a Surgeon, Teacher, and Author. His "System of Surgery" has been pronounced the greatest work on surgery ever written by one man. Born at Easton, Pa.; educated in the public schools and academies; pupil in medicine of Dr. George McClellan; graduate of Jefferson Medical College, 1828; Demonstrator of Anatomy in the Medical College of Ohio, 1833; Professor of Pathological Anatomy, Cincinnati, 1835, where he gave the first systematic course of lectures in the United States on morbid anatomy; Professor of Surgery, University of Louisville, 1840; Professor of Surgery, Jefferson Medical College, 1856. Upon the pedestal of his statue erected, 1897, in the Smithsonian Park, Washington, D. C., is inscribed, "American physicians have erected this statue to commemorate the great deeds of a man who made such an impression upon American surgery that it has served to dignify American medicine."

Dr. Oliver Wendell Holmes, Mass. (1809-1894).—The first in America to maintain vigorously the thesis of "The Contagiousness of Puerperal Fever." A brilliant anatomist, a fascinating teacher, noted for his contributions to medical and general literature. Born in Cambridge, Mass.; graduated in arts at Harvard; medical degree from Harvard, after having spent several years in European hospitals. Professor of anatomy in Harvard Medical School for many years. In his paper on "Puerperal Fever" he writes: "The time has come when the existence of a private pesthouse in the sphere of a single physician should be looked upon not as a misfortune, but a crime."

Dr. W. W. Gerhard, Pa. (1809-1872).—"The merit of having decided this important question, of having demonstrated the essential difference between typhus and typhoid fever, belong chiefly, if not wholly, to Dr. Gerhard." Born in Philadelphia; graduate of the University of Pennsylvania; studied for two years in Paris under the teachings of Louis. Assistant clinical lecturer to Prof. Samuel Jackson; senior physician to the Pennsylvania Hospital for twenty-five years; one of the editors of the *Medical Examiner*.

Dr. Nathan S. Davis, Ill. (1817- ——).—"The father of the American Medical Association." Born in Greene, N. Y.; educated in the schools and colleges of the vicinity; graduated in medicine at the College of Physicians and Surgeons of the western district of New York, 1837. Practiced in Binghamton, N. Y., for several years; removed to Chicago in 1849. At a meeting of the New York Medical Society in May, 1846, he introduced a resolution to the effect that the New York State Medical Society recommend a National Convention of delegates from medical societies and colleges in the whole Union for the purpose of elevating the standard of medical education in the United States. This resolution "marks the inception of the American Medical Association."

Dr. J. Marion Sims, S. C. (1813-1883).—Called the "Father of Modern Gynæcology;" founder of the Woman's Hospital of the State of New York.

Born in Lancaster County, S. C.; graduated at the South Carolina College in 1832; studied medicine at Charleston and Philadelphia; degree in medicine from Jefferson Medical College. Practiced in Lancaster, S. C., and Montgomery County, and Marion County, Alabama; removed to New York in 1853. Especially noted for his successful method of treating vesico-vaginal fistula, and for the invention of various surgical instruments and appliances of the greatest utility in the practice of his specialty. Decorated by the French, Spanish, and Italian Governments. Honorary member of many foreign learned societies.

Benjamin W. Dudley, Ky. (1785-1870).—Master of Western Surgery for 40 years. First of the eminent teachers of the Middle West. First professor of anatomy and surgery in the medical department of the Transylvania University. His success as a lithotomist was unparalleled, having operated one hundred times before losing a patient. His operation of trephining for the cure of epilepsy, marked a new era in cranial surgery. Introduced a new operation for hydrocele by excision of the sac. Famous for his success in treatment of chronic ulcers of the leg by rest, elevation, and elastic compression.

Ether Anæsthesia.

Dr. John C. Warren, Mass. (1778-1856).—The Operative Surgeon in the first public demonstration of surgical anæsthesia. Born in Boston; graduated at Harvard; studied medicine under his father, John Warren; spent three years in the hospitals of London, Edinburgh, and Paris. One of the prime movers in the organization of the Massachusetts General Hospital, and its foremost surgeon until his death. With Doctor Jackson he raised most of the funds for building the Massachusetts Medical College. The first American surgeon to operate for strangulated hernia. Performed the first public operation under ether anæsthesia.

Dr. Henry J. Bigelow, Mass. (1818-1890).—Made the announcement to the world of the great discovery of surgical anæsthesia in a paper read before the American Academy of Arts and Sciences November 3, 1846, and published in the *Boston Medical and Surgical Journal* November 18, 1846. Born in Boston; graduated at Harvard, 1837; degree in Medicine from Harvard, 1841. Professor of Surgery, Harvard Medical School, 1849-'84; surgeon to the Massachusetts General Hospital, 1846-'86.

Dr. Crawford W. Long, Ga. (1815-1878).—The first intentionally to produce anæsthesia by inhalation of sulphuric ether for a surgical operation. Born in Danielsville, Ga.; graduated in arts at Franklin College, Pa.; degree in medicine from University of Pennsylvania; commenced practice in Jefferson, Ga. A wandering lecturer having brought to notice the curiously intoxicating effects of ether, so-called "ether frolics" became common among the young people. On one occasion a negro boy was etherized by the boys to insensibility, and Dr. Long was called in alarm to resuscitate him. This event suggested to Dr. Long the use of ether in surgery, and on March 30, 1842, he used it with success in an operation for the removal of a small cystic tumor of the jaw. He seems not to have appreciated the importance of his discovery, and the world knew nothing of his experiment for several years.

First Public Demonstration of Surgical Anæsthesia, Boston, October 16, 1864.—"The decisive experiment from which dates the continuous and

consequent history of anæsthesia." "The most important event in surgical and one of the most important in human history." The illustration represents the scene in the operating-room of the Massachusetts General Hospital when the patient, a young man with a large vascular tumor on the neck, was being etherized by Dr. W. T. G. Morton preparatory to operation.

Dr. William T. G. Morton, Mass. (1819-1868).—"First demonstrated to the world the art of surgical anæsthesia, the happiest gift conferred upon mankind by medical science or art." Born in Charlestown, Mass.; educated in the common schools; studied dentistry at the Dental College of Baltimore; settled in practice in Boston; tried various methods for relief of pain in dental surgery; experimented upon animals and himself with sulphuric ether; prevailed upon Dr. John C. Warren, then the most famous surgeon in New England, to permit a test of its effects upon a surgical patient in the Massachusetts General Hospital. Operation performed October 16, 1846. Results published to the world November 3, 1846.

Dr. Charles T. Jackson, Mass. (1805-1873).—A distinguished chemist; rival claimant to Morton as the discoverer of the effects of ether as an anæsthetic. Born in Plymouth, Mass.; studied medicine with Drs. James Jackson and Walter Channing; medical degree from Harvard, 1829. Opened in Boston the first laboratory in the United States for instruction and research in analytical chemistry. Made some experiments with ether as an anæsthetic, but never ventured upon a public demonstration of its properties.

Horace Wells, Conn. (1815-1848).—Also a claimant for the discovery of surgical anæsthesia. Born in Hartford, Vt.; studied dentistry in Boston, and began its practice in his native town. Used nitrous oxide gas ("laughing gas") to render painless the extraction of teeth. In a demonstration attempted at the Massachusetts General Hospital, he failed to produce insensibility, and was subjected to much ridicule. After the successful demonstration by Morton, Wells sought a share in the honors. Disappointment at his failure affected his mind, and he died by his own hand.

Twentieth Century.

Dr. Walter Reed, Va. (1851-1902).—Major and Surgeon, U. S. Army; President of the U. S. Yellow Fever Commission. He personally directed the conclusive experiments at Camp Lazear to determine the possibility of communicating yellow fever to non-immune persons, either (1) by the bites of infected mosquitoes, (2) by injection of blood taken from a yellow fever patient, or (3) by exposure to the intimate contact with fomites. Born in Gloucester Co., Va.; graduated in medicine at the University of Virginia, 1869, and at Bellevue Hospital Medical College, 1870. First Lieutenant and Assistant Surgeon, U. S. Army, 1875; Captain, 1880; Major, 1893. Professor of bacteriology and clinical microscopy in the Army Medical School, 1893. Died of appendicitis, November 22, 1902. The honorary degree of M. A. was conferred on him, 1902, by the President of Harvard University, in these words: "Walter Reed, graduate of the University of Virginia, the army surgeon who planned and directed in Cuba the experiments which have given man control over that fearful scourge, yellow fever."

Yellow Fever Investigation.—Researches concerning the Etiology, Propagation, and Prevention of Yellow Fever. Conducted by a Commission organ-

ized in May, 1900, and consisting of the following members: Major Walter Reed, Surgeon U. S. Army, President of the Commission; Dr. James Carroll, Acting Assistant Surgeon, U. S. Army; Dr. Jesse W. Lazear, Acting Assistant Surgeon, U. S. Army; Dr. Aristides Agramonte, Acting Assistant Surgeon, U. S. Army. By a series of brilliantly conceived and skillfully executed experiments it was conclusively proven:

1. The mosquito, *Stegomyia calopus* Meigen (*S. fasciata* Fabricius), serves as the intermediate host for the parasite of yellow fever.

2. Yellow fever is transmitted to the non-immune individual by means of the bite of a mosquito that has previously fed on the blood of those sick of the disease.

3. An interval of about 12 to 18 days after contamination is necessary before the mosquito is capable of conveying the disease.

4. Yellow fever can be produced by the subcutaneous injection of blood taken from a patient during the first and second days of the disease.

5. Yellow fever is not conveyed by fomites, and hence disinfection of articles of clothing, bedding, or merchandise is unnecessary.

6. A house may be said to be infected with yellow fever only when there are present within its walls contaminated mosquitoes capable of conveying the parasites of this disease.

7. The spread of yellow fever can be most effectually controlled by destruction of mosquitoes and protection of the sick of this disease against the bites of these insects.

Dr. Josiah C. Nott, Ala. (—— ——).—The first person to suggest that insects play a part as carriers of yellow fever; presented in a paper entitled "On the Cause of Yellow Fever," published in the *New Orleans Medical and Surgical Journal*, 1848, vol. 4. "It is probable that yellow fever is carried by an insect or animalcule bred on the ground, and in what manner it makes its impression is but surmise; but unless the animalcule is, like that of psora, bred in the system, we could no more expect it to be contagious than the bite of a serpent."

Dr. Carlos J. Finlay, Cuba (—— ——).—The first to formulate a definite theory of the transmission of yellow fever by the mosquito. In a paper read before the Royal Academy of Havana, on August 11, 1881, entitled "The Mosquito Hypothetically Considered as the Agent of Transmission of Yellow Fever," he states: "Three conditions will therefore be necessary in order that yellow fever may be propagated:

"1. The existence of a yellow fever patient into whose capillaries the mosquito is able to drive its sting and to impregnate it with the virulent particles, at an appropriate stage of the disease.

"2. That the life of the mosquito may be spared after its bite upon the patient until it has a chance of biting the person in whom the disease is to be reproduced.

"3. The coincidence that some of the persons whom the same mosquito happens to bite thereafter shall be susceptible of contracting the disease."

Dr. Finlay made many experiments to establish his theory, but failed to make them so conclusive as to command the acceptance of the profession, either in Cuba or elsewhere.

Dr. James Carroll, Md. (1854- ——).—Acting Assistant Surgeon, U. S. Army; member of the U. S. Yellow Fever Commission. Submitted to the

bite of a mosquito which had been hatched and reared in the laboratory and caused to feed upon four cases of yellow fever; four days later he was taken sick with the fever; his was the first in a series of successful cases of mosquito inoculation. Born in England; emigrated to Canada; enlisted in the U. S. Army, 1881; medical degree from University of Maryland, 1891; appointed Acting Assistant Surgeon and assigned to duty at the Army Medical School, Washington, D. C., in association with Dr. Reed. All the reports of the Commission bear Dr. Carroll's name as well as Dr. Reed's. "The accuracy with which the experiments were carried out and the care by which all possible precautions were taken to exclude every source of error are due to Dr. Carroll as much as to Dr. Reed."

Dr. Jesse W. Lazear, Md. (1866-1900).—Acting Assistant Surgeon, U. S. Army; member of the U. S. Yellow Fever Commission. Allowed himself to be bitten on the hand by a mosquito while at the bedside of a yellow fever patient; five days later he was attacked with the disease in a violent form, and died after an illness of one week. Born in Baltimore; graduate of Johns Hopkins University, 1889; medical degree from Columbia University, 1892; after two years at Bellevue Hospital and one year in Europe, was appointed bacteriologist at Johns Hopkins Hospital; appointed on the Yellow Fever Commission in 1900. "With more than the courage and devotion of the soldier he risked and lost his life to show how a fearful pestilence is communicated, and how its ravages may be prevented."

Dr. Aristides Agramonte, Cuba (1868- ——).—Acting Assistant Surgeon, U. S. Army; member of the U. S. Yellow Fever Commission; had charge of the pathological work and the autopsies. Born in Cuba; came early to New York; graduated with honor from the Medical Department of Columbia College, 1890; appointed Sanitary Inspector and Assistant Bacteriologist in the Health Department of New York; Acting Assistant Surgeon, U. S. Army, 1898, and sent to Santiago and Havana to study the bacteriology of yellow fever; appointed on the Commission, May, 1900.

John R. Kissinger, Ohio.—Private in the U. S. Army. Volunteered for the yellow fever experiments "solely in the interests of humanity and the cause of science," stipulating that he should receive no pecuniary reward. He was the subject of the first experiment in Camp Lazear; was attacked by yellow fever three days and nineteen hours after being bitten by infected mosquitoes. In his report of the case Dr. Reed says: "In my opinion this exhibition of moral courage has never been surpassed in the Army of the United States."

John J. Moran, Ohio.—Private in the U. S. Army. Also volunteered, at the same time with Private Kissinger, for the yellow-fever experiments, under the same stipulations. He entered a screened room in which were confined several infected mosquitoes and allowed himself to be bitten by fifteen of them. Three days and twenty-three hours afterward he was stricken with yellow fever.

Yellow Fever Mosquito. *Stegomyia calopus* Meigen (*S. fasciata* Fabr.). Day Mosquito, Calico Mosquito.—Distinguished from other mosquitoes by its velvety-black body, with a distinct, white, lyre-shaped mark on the upper part of the back, with rest of the body and legs being ringed with white. Strictly a domesticated form, breeding in any standing water, foul or otherwise, in or

about houses, especially in cisterns and open gutters. Bites by day, though not in hot sunlight; sometimes on a bright night or by lamplight.

Camp Lazear.—Building where the experiments were made which proved that yellow fever is not transmitted by means of infected clothing. In this ill-ventilated and carefully screened room three men, Acting Assistant Surgeon Robert P. Cooke and two privates of the Hospital Corps, Folk and Jernigan, spent twenty successive nights, surrounded by the soiled garments of yellow fever patients, and even sleeping in the soiled sheets and blankets of those who had died of the disease. None contracted the fever.

Graphic Chart.—Showing the mortality in Havana from yellow fever previous to the demonstration of its transmission by the mosquito and after the obvious preventive measures were instituted. The main line in the chart shows the average number of deaths from yellow fever in Havana each month for 20 years preceding Major Reed's discovery; the dotted line gives the number of deaths in 1891, when preventive measures were instituted. In 1902 there were no cases of yellow fever in Havana.

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